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ANNUAL REPORT

AND

TRANSACTIONS

OF THE

PLYMOUTH INSTITUTION

AND

Devon and Cornwall

NATURAL HISTORY SOCIETY.

VOL. VII. PART I.

1878–9.

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ANNUAL REPORT

OF THE

PLYMOUTH INSTITUTION

AND

Devon and Cornwall Natural History Society.

1878-79.

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SESSION 1878-79.

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Varnier, Alexander, The Crescent

SECRETARIES' REPORT.

1878–79.

The Secretaries present to the Society the following Report of the proceedings of the Session.

The Papers read and discussed were—

1878.		
Oct. 3.	Inaugural Address . .	The President.
„ 10.	Some Facts and Opinions respecting the use of Alcohol	Rev. Harry Oxland.
„ 17.	Weather and Weather Charts .	Dr. Merrifield, F.R.A.S., F.M.S.
„ 24.	The Limitations of "Free Trade"	Rev. Wm. Sharman.
„ 31.	Notes on Local Etymologies .	Mr. R. N. Worth, F.G.S.
Nov. 7.	The Extinct Giant Birds of the Southern Hemisphere . .	Major Briggs.
„ 14.	English Literature from the Elizabethan to the Victorian Era . . .	Mr. T. A. Cragoe, F.G.S.
„ 21.	The English Language in the Light of Modern Scholarship	Mr. D. Slater, M.A.
„ 28.	English Dialects . . .	Mr. J. Shelly.
Dec. 5.	The Rationale of the Distinction between Matter and Mind .	Rev. Professor Chapman, M.A.
„ 12.	Country Fairs and Revels .	Mr. Fabyan Amery.
„ 19.	Digestion . . .	Mr. W. Square, F.R.C.S., F.R.G.S.
1879.		
Jan. 9.	Conversazione.	
„ 16.	Local Literature, Past and Present . . .	Mr. W. H. K. Wright, F.R.H.S.
„ 23.	Lighting by Electricity . .	Mr. C. Oxland.
„ 30.	Shakespeare's "Julius Cæsar".	Mr. Frederic Neild, M.D.
Feb. 6.	The Sclavonic Nations outside the Russian Empire. Communicated by . . .	Rev. W. S. Lach-Szyrma, M.A., F.R.H.S.
„ 13.	Shakespeare's "Coriolanus" .	Mr. Lewis Lewis, M.R.C.S.
„ 20.	The Bone Caves of the Plymouth District . . .	Mr. R. N. Worth, F.G.S.

1879.		
Feb. 27.	The Crustaceans taken during the Cruise of H.M.S. *Challenger*	Mr. C. Spence Bate, F.R.S.
Mar. 6	"Mithras"	Rev. Prof. Beal, M.A., M.R.A.S.
„ 13.	An Unnamed Factor in Organic Construction	Mr. F. H. Balkwill.
„ 20.	The Devonshire Ash-Tree Charm	Mr. W. Pengelly, F.R.S., F.G.S.
" 27.	The Evidences of the Scandinavian on Dartmoor	Mr. C. Spence Bate, F.R.S.

With the exception of two, the lectures announced on the cards were delivered. Mr. W. Harvey, who should have lectured on December 19th, being prevented from doing so by severe illness, his place was supplied by Mr. W. Square, who read a paper on "Digestion;" and Rev. Professor Anthony being unable to read his paper on "Cicero's Letters," as announced, Mr. C. Spence Bate read a paper on the "Evidences of the Scandinavian on Dartmoor," and thus papers were read and discussed upon every Lecture evening of the Session.

The average attendance at the Lectures has been sixty-three, which is about the same as during former Sessions; doubtless it would have been larger had it not been for the severe and inclement weather during the winter, and the feeling on the part of many of the Members and Associates that the hour of meeting is too early.

The Society is much indebted to the Rev. Professor Beal, an Honorary Member of the Institution, who, at much personal inconvenience, and during most inclement weather, travelled from Falstone, Northumberland, on the 6th March, in order to fulfil his engagement, and read his paper on "Mithras."

One lecturing member, fourteen associates, and one lady associate have joined the Society during the year, the numbers on the books now being seventy-one members, one hundred associates, eight lady associates, and two junior associates.

The Society has lost by death three of its Members; viz., Mr. Edward Spender, whose sad fate on the coast of Cornwall, in June, 1878, was deplored by all who knew him; the Rev. Dr. Holmes, formerly President of the Institution, who read many valuable papers within its hall, died in October, 1878, and was followed to the grave by a large number of the Members and Associates; also a promising young Member, Mr. S. N. Serpell.

The Annual Excursion, which was intended to be held at Okehampton, for Cosdon Beacon, Belstone Cleave, &c., on the 26th June, did not take place.

At the Anniversary Meeting, held on the 1st May, and which was well attended, the following short papers were read and discussed, viz. :

"Some Notes on Neglected Biographies."
Mr. R. N. Worth.

"Remarks on the Method of determining the Velocities of Rotating Cylinders by means of connecting them with Vibrating Tuning Forks." (Authors, Lieut. Clarke and Professor Mc Leod.)
Mr. R. Bishop.

"The Tellurium, exhibited and explained."
Mr. F. J. Webb.

A Conversazione, which was well attended, was held on the 9th of January, 1879, at which was exhibited a fine collection of oil and water-colour paintings by local artists, mostly members of the Institution. There were also many photographs, engravings, microscopes, &c., and curiosities from Cyprus, lent by Lieut. McGuire Bate, R.E. The vestibule and hall were tastefully decorated with evergreens and rare plants, kindly lent for the occasion.

The Curator of Fine Arts reports :

"A very interesting drawing in water colours has been added to the collection of pictures already in the hall, that of a portrait of an old and much-esteemed member, the late George Wightwick. It has been presented to the Institution by his widow, through the interest of Mr. William Eastlake and your Curator. I could have wished that this picture had been in oils, to be placed with those we already possess of the members who were his contemporaries. It may be remarked that this being the first present of a water-colour drawing, it should be looked on with additional interest, as being perhaps the nucleus of a collection in that department of art. I am further of opinion that if there were wall space in the Athenæum works of art would be forthcoming by loan and gift that would soon form a permanent exhibition."

The Curator of Geology and Mineralogy reports :

"During the past year the work of rearranging the geological cases (which was commenced in anticipation of the visit of the

British Association to Plymouth) has been continued. The space available for the exhibition of specimens is now completely utilized, and has been devoted entirely to the *Devonian* geology and the ossiferous deposits of our own county.

"There have been several important additions, among which may be mentioned—

"1. A collection of bones, &c., from a cave opened at Pomphlett during the summer of the year 1878, presented by Mr. J. Goad. Among these bones is a very fine core of the horn of *Aurochs*, and teeth of *Ursus spelæus*, and bones and teeth of *Bos longifrons.*

"2. A collection of bones from the Oreston Caves, presented by Mr. R. Bayly. This collection is specially valuable as containing a remarkably fine third molar of *Elephas primigenius.*

"3. A collection of bones from Pixies Cave at Chudleigh, presented by myself. These bones are believed to be the only specimens from this cave in any public museum. Among them is a very large and perfect tooth of *Ursus spelæus.*

"4. A much weathered slab of Plymouth limestone from some excavations between George Street and George Lane, containing the remains of several corals and crinoids, with traces of bivalves; presented by Mr. Worth.

"5. A polished slab, containing several *Euomphali*, *Murchisonii*, and *Macrocheilii*, from a large mass of these gasteropods found during some excavations on the north side of the Millbay Docks; presented by Mr. J. C. Inglis.

"6. Two fine specimens of *Euomphalus*, and an embedded limestone pebble, from the same locality as the last named slab; presented by myself.

"7. In addition to these, an almost complete lower jaw of wolf from the Oreston Caves has been purchased of Mr. Hodge, of Turnchapel.

"8. The extensive collection of bones obtained from the Battery Hill Cave at Stonehouse, and presented to the Institution some years ago by Mr. C. Spence Bate, has been assigned its proper place in the geological cases.

"9. During the recent excavations at Battery Hill other bones have been found and presented to the Museum by Mr. F. Brent, including remains of *Rhinoceros tichorinus*, horse, and red deer (*Cervus elaphus*).

"The neighbourhood of Plymouth having been peculiarly rich in ossiferous deposits, owing to the immediate contiguity of the limestone rocks, it is only fitting that the Museum of the Plymouth Institution should contain as complete a record as possible of these products of the Devonian caverns. We now have a tolerably complete set of representative specimens from all the known bone caves in Devon, except the latest discovered at Brixham. They include bones from the Hoe fissures (Plymouth), Stonehouse, Oreston, Pomphlett, Yealmpton, Chudleigh, Ash Hole (Brixham), and Kent's Cavern (Torquay).

"A statement of the specimens belonging to each cavern will appear in the Society's *Transactions*, appended to the paper read by Mr. R. N. Worth, on February 20th, 1879, to whom the Society is indebted for the classification and arrangement of this portion of the geological collection, properly to display which as it deserves would occupy more space than is at command.

"The general collection of fossils remains much the same as reported last year.

"The mineralogical collection has received a few additions. Mr. Brent has presented some *gneiss* from the Eddystone, also a beautiful piece of *hematite iron ore*, and some *garnets* in the mass; and Mr. Worth a piece of *axinite* from South Brent, and *iron ore* from Perran.

"The mineralogical collection has far outgrown the available space in the show-cases, as in addition to the already overcrowded cases, there are large numbers of specimens in the drawers under the eastern case which are practically useless for want of adequate exhibition space.

"Besides these the nucleus of a collection of *dressed local rock specimens* has been formed, which may be made of considerable economical value to the district. Contributions to this collection will be welcomed."

The Curator of the Library reports:

"The Curator of the Library in his Report for last year called the attention of the Society to the need of additional shelves for the books. This want has been met by the fixing of some additional ones on each side of the window of the Library, through which sufficient space has been obtained for a due arrangement of the volumes for two or three years to come.

"As in past years a number of volumes of serials subscribed for or received from other Societies have been bound and placed with the respective sets on the shelves.

"It is pleasing to find the published 'Transactions' of the Society valued and sought after by similar learned Associations. During the past year the Royal Society have agreed to supply their own 'Proceedings' in exchange for them; as have also the Geologists' Association of London, and the Natural History Society of Glasgow.

"The Librarian having been applied to for certain parts of the 'Transactions' by persons desirous of possessing copies, the Council have resolved to sell them at such prices as are given in the notice now fixed in the lobby of the Athenæum.

"One of the Curators, Mr. James Hine, has designed an emblematical label for pasting within the covers of the books. This has since been engraved for use.

"The Librarian is glad to report that the three volumes; viz., 'Bottrell's Transactions and Hearth-side Stories of West Cornwall' (1st series); 'Murchison's Silurian System;' and 'Shea's Animal Physiology,' missing last year, have all been recovered. On the other hand, Darwin's 'Descent of Man,' vol. ii., is now missing.

"The following works have been purchased: 'Geological Record,' 1876; Palæontographical Society's publications, 5 vols., and that for 1878; 'Zoological Record,' 1876; 'Zoological Society Proceedings,' several vols. to complete set; 'Brady's Monograph to the British Copepoda,' Ray Society; 'Microscopical Journal,' vols. i.–xi.; 'Rutley's Eruptive Rocks of Brent Tor and its Neighbourhood;' 'Yarrell's Birds,' ed. 4, part 12; 'Norden's Survey of Cornwall,' 1728; 'Early English Text Society's' volumes for the past year. The following have been presented: 'Halliwell's Rambles in West Cornwall,' 1861; 'Wilkie Collins's Rambles beyond Railways;' 'Spargo's Mines of Cornwall,' 1865; 'Turnor's Astra Castra;' 'Transactions of Historic Society of Lancashire and Cheshire,' vols. viii. x., by Mr. J. Brooking Rowe. 'The Ibis,' vol. i., by Mr. Stephen Clogg, of Looe; Italian Pamphlets, Maps of Turkey, &c., from Mr. W. P. and Mrs. Jervis; 'Weather Charts,' from Dr. Merrifield. The following Parts of Serials have been received, mostly in exchange for the 'Transactions': Australia, 'Catalogue of Plants under Cultivation in Government Botanic Garden, Adelaide,' from Mr. W. Wyatt; 'Berwickshire Naturalists' Field

Club Proceedings,' vol. viii., No. 2, 1877; Bristol, 'Proceedings Naturalists' Society,' vol. ii. part 2, 1877–78; 'British Association Report,' 1877; 'British Association,' Index of Reports from 1831–60, from Society; Cornwall, 'Journal of Royal Institution,' Nos. 19 (part 2), 20, Annual Report for 1878; Cornwall, 'Royal Polytechnic Society,' 44th Report, 1877, 45th, 1878; 'Devonshire Association Report,' vol. x., 1878; 'Edinburgh Botanical Society Transactions,' vol. xiii. part 2, 1878; Edinburgh, 'Report of Regius Keeper of Royal Botanic Gardens,' from Mr. F. J. Webb; Italy, 'Atti della Societa Toscana,' vol. iii. fasc. 2; Liverpool, 'Proceedings of Literary and Philosophical Society," xxxii., 1877–78; London, 'Quarterly Journal of the Geological Society,' Nos. 34–37; London, 'Geologists' Association's Proceedings and Report,' 1878; London, 'Royal Society,' vol. xxvii. and Nos. 190, 191; London, 'Zoological Society Proceedings,' parts 1, 2, 3, 1878; 'Norfolk and Norwich Naturalists' Society,' vol. ii. part 4; Plymouth, 'Catalogue of Books in Free Library,' from Mr. Wright; Somersetshire, 'Proceedings of the Archæological and Natural History Society,' vol. xxiii.; Tyneside Field Club, 'Natural History Transactions of Northumberland and Durham,' vol. vii. part 1; United States, 'Coue's Birds of the Colorado Valley,' part 1; United States, 'Descriptive Catalogue of Photographs of North American Indians,' 1877; United States, 'Lesquereux's Tertiary Flora;' United States, 'Geological and Geographical Survey,' vol. iv. Nos. 1, 2; United States, 'Tenth Annual Report of the Survey;' United States, 'Preliminary Report of Field Work of the Survey,' 1877; United States, 'Bulletin of the Survey,' vol. iv. No. 4; New South Wales, 'Journal of the Royal Society of New South Wales, 1877; New South Wales, 'Remarks on Sedimentary Formations of New South Wales;' New South Wales, 'Report of Railway Commissioners of New South Wales,' 1876, from R. S., of New South Wales; Winchester, 'Proceedings of the Winchester and Hampshire Scientific and Literary Society,' vol. iii. part 1, 1878.

FRANCIS BRENT, } HON.
JAMES C. INGLIS, } SECRETARIES.

TREASURERS' REPORT.

1878–79.

The accounts and balance sheet now presented call for little comment. Connected with the Museum the expenditure seems heavy, but it includes the payment of the balance due for the purchase of the Julian collection of birds, which it is presumed will be eventually repaid. The Curator of Zoology, at whose instance the purchase was made, kindly undertook to raise the sum required over and above the grant made by the Society; but your Treasurers have not received any further money on this account. The expenditure, as shown under each head, has been about the same as in former years; but there are some accounts known to be due, which have not yet been sent in, so that although the balance against the Society is less than that of last year, the debt due may be considered as about the same.

On the credit side of the account there has been a slight falling off in the subscriptions, and a considerable decrease in the amount received for the use of the Hall.

J. BROOKING ROWE, } Hon.
S. CATER, } Treasurers.

April 3rd, 1879.

BALANCE SHEET

OF

The Plymouth Institution and Devon and Cornwall Natural History Society.

For the Year ending 4th April, 1879.

	£	s.	d.		£	s.	d.
To Library	34	12	2	By Annual Subscriptions, at 21/-	174	6	0
Lighting and Warming	11	5	1	Annual Subscriptions of Lady and Junior Associates, at 10/6	5	5	0
Salaries and Commission	16	1	6	Arrears of Subscriptions	7	7	0
Interest	8	15	6	Rent of Hall	9	19	0
Repairs, &c.	2	11	0	Donations	1	11	6
Taxes and Insurance	4	18	2	Sale of Transactions	0	7	6
Reports	42	11	0	Balance	47	16	4
Museum	27	17	6				
Conversazione	3	0	9				
Petty Disbursements	8	8	9				
Stationery, &c.	11	7	0				
Balance last year	75	3	11				
	£246	12	4		£246	12	4

We have examined the foregoing Accounts and Balance Sheet, and have compared them with the Vouchers, and find the same correct.

RICHARD BISHOP,
CHARLES OXLAND, } *Auditors.*

4th April, 1879.

An ABSTRACT from the METEOROLOGICAL REGISTER, from 1st January, 1878, to 31st December, 1878, kept at the Navigation School, Gascoigne Place, Plymouth (Lat. 50° 22½′ N., Long. 4° 7¼′ W.), by JOHN MERRIFIELD, LL.D., F.R.A.S., F.M.S.

MONTH.	BAROMETRICAL PRESSURE REDUCED TO MEAN SEA LEVEL AT 32° FAH.			TEMPERATURE.			HYGROMETER.				RAINFALL.		DIRECTION OF WIND AT 8 A.M.				
	Average Barometer	Maximum for Month.	Minimum for Month.	Average Maximum in shade.	Average Minimum.	Average temperature.	Average dry Bulb.	Average wet Bulb.	Average dew Point.	Average humidity Saturation, 100.	No. of days on which not less than ·01in. fell	Quantity for the month in Inches.	From N. to E.	From E. to S.	From S. to W.	From W. to N.	Calm.
1878																	
January .	30·220	30·692	29·430	48·82	38·85	43·84	41·97	40·96	39·72	91	18	2·15	5	0	10	10	6
February .	30·272	30·665	29·719	49·21	40·14	44·67	43·02	42·08	40·95	92	11	1·81	7	5	5	1	10
March . .	30·153	30·663	29·034	51·47	38·68	45·08	42·11	40·45	38·41	87	11	1·34	4	0	4	18	5
April . .	29·790	30·163	29·272	54·70	43·50	49·10	47·78	46·27	44·61	89	22	4·08	12	4	5	3	6
May . .	29·772	30·150	29·340	60·29	49·44	54·87	54·47	52·19	49·98	85	21	4·17	6	10	8	6	1
June . .	29·931	30·266	29·486	66·66	53·95	60·31	60·43	57·44	54·81	82	18	2·67	3	10	10	6	1
July . .	30·065	30·351	29·755	71·32	57·29	64·31	63·62	60·55	57·97	82	9	1·59	10	2	5	13	1
August . .	29·748	30·247	29·430	68·26	57·31	62·78	61·41	59·59	58·01	88	22	5·41	8	6	13	1	3
September.	30·029	30·269	29·521	64·87	51·52	58·20	56·59	54·79	53·12	88	14	2·94	4	3	8	8	7
October .	29·773	30·268	29·050	58·95	47·50	53·23	50·82	49·59	48·31	91	21	3·34	6	7	6	8	4
November.	29·816	30·416	29·387	46·92	35·18	41·05	38·89	37·73	36·19	90	19	2·44	6	1	3	19	1
December .	29·747	30·320	29·329	41·86	29·79	35·83	33·94	33·30	32·17	94	18	3·64	10	2	6	10	3
Average for 1878	29·943	30·373	29·396	56·94	45·26	51·10	49·59	47·91	46·19	88	204	35·58	81	50	83	103	48
Average for 14 Years . .	29·939	30·384	29·310	58·48	45·29	51·88	51·19	49·30	47·33	87	182·1	37·23	75·4	66·8	108·1	87·5	27·4

The observations are all made at eight a.m. The Rain Gauge is by Casella, and is 8 inches in diameter; its top 9 feet 2 inches above the ground, and 75 feet above the mean level of the sea. A rainy day is one in which not less than 1-100th of an inch falls. The instruments have all been supplied by the Meteorological Committee of the Royal Society, compared at Kew, and the index error supplied to each.

ADDRESS

AT THE OPENING OF THE SESSION 1878–79.

BY DR. ROBERT OXLAND, F.C.S.,

President.

Mr. Vice-President, Ladies and Gentlemen,

I have the pleasant duty of congratulating you on your presence at the inauguration of the sixty-sixth lecturing session of our Institution, which I think we may venture to hope, from the programme of lectures already issued, will not fail in accomplishing some of the best objects of our Society.

The lapse of two-thirds of a century has swept away all the original members of the Society. I believe that there is not now one living, though Mr. G. W. Soltau, whose father lectured on "Agriculture," March 28th, 1816, was present at the early meetings. Of all the goodly band that initiated our proceedings we have now but a few mournful portraits, or, better still, records of their works. The Rev. J. Fletcher, who lectured Dec. 2nd and 9th, 1813, on "Oxygen and its Combinations," is but recently deceased.

How great have been the changes that have taken place since the year 1812, when the first meetings were held at the residences of Messrs. Soltau, Ogg, and other gentlemen;* or even since the year 1819, when this building was finished and first used for meeting. Not only has the immediate neighbourhood been altered, but the whole world has been revolutionized, physically and morally, with the happiest effects. It has now become comparatively a very small space. The march of events has been so rapid that, at least as far as history will serve us, we may venture to say that in no equal period of time have such momentous changes taken place as since 1812 up to the present moment; but our Institution still continues in existence — may we not hope with undiminished vitality, and with at least as good reasons for existence and continuance as it ever had?

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* "Annual Reports of Institution," vol. i. p. 3.

For more than thirty years that I have had the privilege of sitting on the side benches, or by the lecturer's door, surmounted by the motto so well chosen by the Rev. Mr. Lampen, who gave the first inaugural address, in 1819, in this hall,

ΤΟΙΣ ΝΥΝ ΚΑΙ ΤΟΙΣ ΕΠΕΙΤΑ,

I have occasionally, when unable to fix attention on the lecture, or to join in the discussion, had my thoughts directed to its meaning, and I have sometimes thought that the plain English rendering might be advantageously attached, and so become serviceable; for I presume that it may not be beneath the dignity of the Society to admit that there may possibly be richly-endowed members amongst us who may not be able to readily interpret it.

Through your kind suffrages at our last Annual Meeting I have been brought to face this motto; and I venture to offer it as the text of my Address—

"FOR THE PRESENT AND FOR THE FUTURE."

The Present is the fruit, the product of the Past; and the seed, the foundation of the Future.

How have we reached the Present? By what labours of our predecessors have we attained our present position? What is it necessary for us to do to insure as good a history for the Future as for the Past?

The professed objects of this Institution, as stated in the Trust Deed, are "for the delivery of lectures, and for discussions on the different subjects of Science, Literature, and the Fine Arts;"* and they are further elucidated in the preface to the Laws of the Institution, printed 1827, thus: "To promote the cultivation of useful knowledge, by encouraging habits of research, and affording opportunities to persons of various pursuits to communicate with each other by the reading of essays on literary and scientific subjects, and afterwards entering on the discussions to which they may lead."

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* "Laws of the Plymouth Institution," 1827, bound up with "Annual Reports of Plymouth Institution and Devon and Cornwall Natural History Society," vol. i. 1855 to 1865.

In searching through the records, incomplete as they are, of the labours of our predecessors, we cannot but be struck with the very complete manner in which the original designs of the founders of the Institution have been carried out. But these records after all convey but a very feeble representation of the work accomplished; for a most important part of the proceedings, the discussions, have not been reported. I have been particularly struck with this when reading the reports of the discussions on the lectures always given in full in the *Society of Arts Journal*; for I have then been reminded of the many intensely interesting, often most spirited and exceedingly useful discussions, that have taken place here, when the great value of some apparently dry and uninteresting, because perchance most laboriously prepared lecture, has been splendidly elucidated.

The changes of condition of society render this part of the design more important than ever; for the great abundance of supply of information in periodical literature to a certain extent supersedes the necessity for communication by lectures. The increased number of Societies—such as the Royal Society, British Association, Chemical, and Geological—for the cultivation of special studies, draws off the reporting of results of original research to their more attractive, because more extensive, form of publication; but none of these can replace the advantages obtainable by the common *viva voce* discussion of subjects of interest here. In books "we may read, and read, and read again, and still find something to please and something to instruct;" but they are but poor substitutes for the life and spirit of living thought, which in conversation act and react, produce and reproduce ideas that may energize latent power into beneficent action, and convert spiritual thought into permanent deed lasting as the world itself.

Are there not even yet still among us some who can with vivid pleasure recollect prophetic enunciations of schemes, at once pronounced utopian and ridiculously impossible, which have already become the accomplished facts and utilities, the indispensable comforts, of our every-day life?

To know where we are now and to contemplate where we are going, it is necessary to consider the way by which we have come. Let us take the A.D. as the mile-post of our road. In 1812 there was no gas, neither steam-boat nor locomotive, no telegraph, no daily press, very poor postal communication; all the necessaries of life were heavily taxed, even light, fresh air, bread, and salt; locomotion was painfully difficult and expensive; roads bad; postal communication very costly, a letter to London costing thirteen pence, where now a halfpenny would pay; education administered in homœopathic doses to the upper classes, rather as a tonic than as a necessary, a bread of life carefully protected from the communion of the lower classes, for fear of enabling them to rise above their state of slavish subjection. This "Good Old Time" when men were strung up to the gallows for infringing the privileges of property by stealing to the value of five shillings; aye, and women too, even for stealing bread for the starving children left destitute by the abduction of the father by the legalized press-gang. It was not until 1820 that the intelligent legislature discovered the value of life to be more than five shillings per head. It was not until 1836 that they gained sufficient intelligence to allow prisoners in criminal cases to have the assistance of counsel. The public press was subject to all sorts of careful provisions against being rendered useful and efficient. Men and gentlemen were regarded with admiration and applause according to their brute courage and powers of drinking. In the midst of such society our early members must have been men of mark to stand up to their work, to turn away from the allurements of the "Society" of the day, and devote themselves to the cultivation of their intellect and to the spread of knowledge, not only amongst themselves, but amongst their towns-fellows. And did they succeed? Have they done anything in the helping forward of the great work that has already been accomplished? that has converted the United Kingdom of 1812 into the United Kingdom and Colonies of Canada, British Columbia, Australia, New Zealand, &c., &c., of the Greater Britain of to-day?

We cannot possibly attempt anything like a full exposition of what they did, and probably, even if we worked hours at the investigation, we should not be able to worthily demonstrate the efficiency of their labours. Take then only a few of the instances that are close at hand.

In 1812 certainly not, and I believe that even in 1819 our members did not, enjoy in this room the comfort of gas; and much less still did they do so in their own homes. Indeed, although gas had been used for street lighting, and for the illumination of shops and public buildings, it was not much before 1850 that it came notably into use for domestic lighting. In the year 1825 gas lighting was still such a rarity that as a child I used to participate in the pleasure of the little crowd of street urchins that followed the heels of the dapper ladder-carrying lamplighter from lamp-post to lamp-post, and proclaimed their delight with vociferous utterances on the flashing out of the light. Even then whale-oil-lighted lamps were interspersed through the remote streets of the town. Well, now we see a noble establishment of Gas Works at Coxside that will compare well with any in the kingdom, paying a handsome revenue to the contributors of the capital invested, and earning the well-merited reputation of supplying the cheapest gas in the kingdom, probably in the world.

And what has that to do with us?

I recollect again and again listening with great pleasure in this hall, and in the Mechanics' Institute, to the very lucid scientific lectures most admirably experimentally illustrated by one of our old members, Mr. Jesse Adams, who was the first manager of the first Coal-Gas Works for many years in operation at Millbay, on the site of the present foundry in Phœnix Street, south of Union Street. At that time gas was regarded not only with admiration, but also with wonder, fear, and trembling. High authorities, even Sir Humphry Davy himself, had pronounced strongly against the dangers and absurdities of the daily use of gas, just as energetically as the introduction of electrical lighting is to-day contravened, and so there was the necessity for the advocacy which was so ably and efficiently maintained by him.

We have now ready enough access to the adjoining county of Cornwall, so easy that we seldom bestow a thought on the noble Tamar river separating the two counties, when we gently slip over it in our comfortable railway carriages upborne by the Brunel Railway Bridge. Perchance in passing we may look down on the floating bit of bridge conveying horses, carriages, and foot-passengers, from the waterside of Saltash to the Devonshire shore, and then recollect that it is but a copy of the finer bridge still doing useful work at Torpoint, which was originally devised by another of our old members, Mr. Rendel, under whose superintendence it was constructed, as were also similar bridges at Gosport, Hitchen, and other places throughout the country. Our literary members have often discoursed to us most delightfully respecting old Devonshire Worthies; have told us of the doings of some of the men whose portraits we have on our walls. We still remember Rooker's tales of Drake and Raleigh, of Hawkins, of Frobisher, and others. We think of their achievements, find it difficult to believe in the smallness of their ships and their means, and perchance take courage for other undertakings; but if we now indulge in an hour's walk around the splendid Docks that are already completed, or are being constructed, that cover the inlet of the sea between the old Long Room Barracks and the old Rusty Anchor (both now obsolete), we should do but justice to their memory and reflect honour on our Institution, to remember that this grand undertaking was initiated and carried out to a very considerable extent by Mr. Rendel, supported and directed by another of our old members, Mr. Thomas Gill, who for many years ably represented this town in Parliament.

Taking up Brendon's October Time Tables, I find that from this port are appointed to sail no less than fourteen fine ships, mostly steam, for Australia, New Zealand, South America, the Cape of Good Hope, the West Indies, the United States; and many others to France, Germany, and other ports on the Continent; to say nothing of the many fine steamships that coastwise run to Ireland, Liverpool, Glasgow, London, Hull, &c. And then on the list of arrivals we find just the same number (thirteen) expected from Australia, New Zealand, Southern Africa, South America, Demerara, the West Indies, Chili and Peru, from the Northern States, and California, whose arrivals may be predicted to the hour, almost to the minute. These lists explain the existence of the Docks in their present condition, and the very active preparations going on in them and in the vicinity for the further extension of commercial operations. The founder of the Great Western Docks, Mr. T. Gill, was for a considerable time the chairman of the Plymouth New Zealand Company, which largely contributed to the successful establishment of one of the most flourishing of the British colonies.

These great ships—those wonderful floating palaces in which persons of very moderate means may continue travelling with home comforts about them, and enjoyments that could not be obtained for love or money by the richest of our early members even on *terra firma*—whose movements, spite of winds and waves, are almost as punctual as the clock (will you be surprised if I tell you?) were originated to a great extent by one of our early members, who, I believe, is still living, although not amongst us:

for his invention caused his transfer from Devonport to important and responsible duties in Liverpool, probably next to London the greatest shipping port in the world. I refer to Mr. J. T. Towson, who in the year 1847 "invented and composed a set of tables,"* the importance of which was so apparent that the publication of them was undertaken by the British Admiralty. He thus revived the idea of Great Circle Sailing, the principle of which was known to Vasco de Gama, the discoverer of the Cape of Good Hope, but which was lost sight of, and fell into abeyance, on account of the difficulties of practically carrying it out on the part of the ordinary navigators.

The Tables were so arranged that by simple inspection any ordinary navigator might avoid the difficulties and chances of error in personal calculations, and then by dint of persevering energy he succeeded in getting the English Admiralty to publish them in a readily available form. At that time there was an active emigration going on, principally from Plymouth, to New Zealand and Australia, and ships returning brought large supplies of corn and wool; but the greater number of emigrants passed away from British rule to become citizens of the United States, because of the greater facility of access from the comparative shortness of the sea voyage. A good voyage to Sydney or Melbourne by sailing ships occupied four to five months—112 to 140 days.

In 1847 Mr. Towson had a conference with the owners and captain of an Australian liner, resulting in the determination to test the system. The most triumphant success attended the experiment. The first voyage accomplished the journey in about eighty days. In 1849 he introduced the "Composite" principle of sailing, and Captain Godfrey, in the *Constance* sailing ship, adopting the plan agreed on, accomplished the voyage in seventy-seven and afterwards in seventy-six days from Plymouth to Adelaide. It is hardly possible to describe the wonderful issues dependent upon this application of quiet thought worked out in the retirement of private life. It would take a very long paper fully to elucidate it; but Mr. Towson was not a man to rest upon his laurels; he was judiciously placed by the merchants of Liverpool in a position to mature his plans; and so calling to his aid the then young Secretary of the Falmouth Polytechnic, another of our old members, Mr. Rundell, to superintend magnetic observations, by amalgamation of

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* "The Principles of Great Circle Sailing, 1855." By J. T. Towson.

Maury's Laws of Currents and of Storms, the Composite system of sailing was effectually introduced, and it has now become the means, with the aid of steam, of bringing the most remote parts of the earth within forty days' sail. Nor ought we to forget to mention the aid that was rendered in prosecuting this great scheme to successful issue by another of our members, who has often charmed with his hearty voice in lecturing to us on practical questions pertaining to the sea, and discussing with us not sea-lore alone, but all other general matters of lectures. Capt. Walker, for many years Queen's Harbour Master of this port, was one of us, did us good service, and better still to his Queen and country by the aid he rendered Towson, and by his elucidations of some of the laws of magnetism as affecting the compass as a sailor's instrument.

Again ships, ships, ships; can a Britisher be tired of them, let alone a Plymouthian or a seaport Englishman?

Sir Francis Drake, we are told, went around the world in little ships not larger than our trawlers; we go around them in ships big enough to hold the population of a little town, in greater comfort and safety than can be found in any town in Britain. His ships were of wood, and their successors were wont to be talked about as the wooden walls of old England; but our ships are of iron and of steel. He and Raleigh, and Frobisher, and Hawkins, had to do their work, trusting in their powers to control the winds and the waves to their purpose, through the living sunshine. We have to dig the fossilized sun-force out of the earth and to use it to our purpose with careful measure and strict judgment, to fight against the powers of the air and the sea when they are not in accord with our purpose, to harness them together to do our work when they do agree.

In 1812 the first steamship was launched on the Clyde, but it was not useful. In the year 1818 regular sea voyages were undertaken in the Channel. The *Sir Francis Drake* began to run in the summer time only from Plymouth to Portsmouth, and the Channel Islands soon after were associated with the *Brunswick*. These two vessels continued to run for many years. The former was a remarkably well-built, well-engined vessel for her time.

It was not until 1838 that ocean voyages were attempted, and successfully too, by the *Great Western* and *Sirius*, in the face of high authority to the contrary, as to the impossibility of accomplishment.* Once accomplished, the necessary improvements became more obvious, and by diligent application of the scientific principles involved the construction of engines and ships has been so greatly improved, that not only do steamships cross the ocean to New York, but even to Australia they can go without difficulty in good sailing trim, and on good paying terms; and now about thirty-six days is considered a good voyage to Melbourne. This has been brought about principally by the reduction of the consumption of coal with the simultaneous production of great increase of power; and shortly it may be stated that where, less than fourteen or fifteen years since, to produce one horse-power per hour required 20 lbs. of coal, now 2 or 2½ lbs. will do the same work.

In the earlier times the destruction of steamships by fire was of common occurrence, arising from the want of knowledge how to produce and apply heat. The boilers were so wrongly constructed that so much of the heat was developed in the funnel or chimney, and at its loss, (instead of, as it should have been, within the boiler,) that constantly the ships were being set on fire; and this for want of knowledge of the chemical laws of combustion which were so ably taught by our own Hearder, and by Wye Williams, the author of the most practical scientific work on the subject ever published.

Not only in this room, but in many parts of the country, Jonathan Hearder gave his beautiful lectures on combustion, and I have no doubt that he thereby largely aided in diffusing a knowledge of the scientific principles involved, which have become, not only in the steamship, but also in the locomotive and stationary engines, and in fire industries, more valuable in proportion as they have been diligently and intelligently applied.

Yet again, in connection with ships and with public buildings, do we find another of our scientific members, whose name is inseparably connected with them. At one time it was a very common occurrence to hear of ships and buildings being struck and destroyed or injured by lightning; now we very seldom hear of such a case, because our Sir W. Snow Harris diligently studied the laws of electricity, elucidated them, and applied them; and if in our visit to the Dockyard we will take the trouble to enquire for

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* Dr. Dionysius Lardner published a report on calculations which demonstrated the impossibility of practically making the voyage to New York, saying that the attempt was as absurd as a voyage to the moon.

Harris's Lightning Conductor, we shall find every mast of every ship has a strip of copper inlaid on its surface in accordance with his instructions, and they are now known by incontestable proofs to be perfect protectors against the destructive action of lightning. The saving of life and of treasure to the commonwealth can hardly be estimated.

Looking over the list of lectures, I find that Mr. W. Snow Harris gave his first lecture on "Application of Fixed Conductors to Ships' Masts" October 21st, 1822. Not only in this connection, but also in the more modern applications of electricity to our daily necessities in the shape of the electric telegraph by sea and land, we are constantly reminded of Sir W. Snow Harris by quotations by the highest authorities of the results of his laborious researches; and here again I must refer to the labour of, I think I may say, the most active, indomitable, and successful original scientific investigator that we ever had amongst us. It seems a desecration to call him Mr., and not Jonathan Hearder. I have a right to say this; I knew him well. I have worked with him day after day, week after week, from early morn until late at night; he blind, I halting for want of strength to follow him; he never tiring, ever bright, cheerful, and cheering, devising and making new apparatus, discussing new lines of investigation, reviewing again and again old experiments on the laws of combustion, on frictional and voltaic electricity, making improvements in the induction coil of Rumkhorf, experimenting on the conductivities of metals in reference to heat and electricity, contriving and making with his own hands, although blind, new electrical apparatus in the shape of his machine for curative purposes, and in the manufacture of submarine telegraphic cables.

I love to dwell on the scientific teachings of such a man, because I know that they produced great and good effects, and that the results of such labour are exhibited in the great ships that now plough the ocean, and make the remotest corners of the earth, the dwellings of our nearest relatives, easy of bodily access, and within almost a few hours' reach by the electric telegraph which he helped to mature, having predicted its utopian performances long before it became an accomplished fact.

One other name I cannot pass by, John Prideaux, one of the most hard-headed scientific teachers we had amongst us. His contributions to the geology of the neighbourhood, his instructions in agricultural chemistry, were very useful; and his professorship of chemistry in the Mining College at Truro, established by Sir Charles Lemon, turned out young men who have since occupied very important positions as miners and metallurgists in all parts of the world; greatly assisting in the development of those discoveries of the precious metals in California, Nevada, and Australia, which were initiated from 1847 to 1851, and have already effected the establishment of new states and governments.

I had the good fortune to be his demonstrator for a season; but was succeeded by Dr. Letheby, another of our old members, who eventually became Professor of Chemistry in the London Hospital, Public Officer of Health for the City of London, and Public Analyst for several counties.

Mr. Prideaux's lectures on Agriculture and Agricultural Chemistry in this hall and elsewhere at a momentous period in the history of this country, that of the abolition of the Corn Laws and adoption of Free Trade, which rendered the application of scientific principles to agriculture a possibility as well as a necessity, directed the attention of the public to the value of artificial manures, and contributed much to the establishment of those important chemical and artificial manure manufactories for which this town and neighbourhood are distinguished.

Turning away from this tempting topic, we would ask, What has been the most remarkable and most active agent in the production of these great developments of energy, and of the consequent changes in the conditions of the world? I think I shall not find now any dissentient amongst my audience when I venture to answer, The increased vitality of literature as evidenced by and in the free press of our country.

It used to be the fashion in this hall at one time for the followers of literature and the adherents of science to contend which was the more worthy, much the same as if the mouth and the eyes were to contend as to which might be the more important member of the human body.

The young people of to-day cannot possibly judge of the value of the literature of the present time, such and so constant are the torrents of it poured forth in the daily, weekly, monthly, quarterly, and occasional productions of the press.

The early history of our older members presents clearer because less numerous landmarks for observation. They had no daily papers to distract their attention, nor periodical literature, nor cheap books of any kind; but how rich was the enjoyment of the stolen interviews of the then young, but now old, boys with Robinson Crusoe, with the terrors of the classical Macaulay, another of our old members, impending! How delightful their converse with Sandford and Merton! What bargainings and chafferings for marbles, taws, and alleys in exchange for loans of the current stock of literature, limited to Pope's *Homer*, *Odyssey*, and *Iliad*, Anson's *Voyages Around the World*, Rollin's *Ancient History*, *Captain Cook's Voyages*, Milton's *Paradise Lost*, Bunyan's *Pilgrim's Progress*, Fénélon's *Adventures of Telemachus*, and a few others.

It may not be so now, for unfortunately I have not much access to school-going boys; but I am very certain that *Robinson Crusoe* made more sailors out of my school-fellows than anything else, and I find it difficult to believe other than that every worthy reader of *Robinson Crusoe* was more or less a sailor at heart. What a terror he was to fond parents, fearing hydromania from his bite! I was bitten by him, and never recovered; for if you do not know him, I must tell you that he was a Professor of Technological Chemistry as well as of Geography and of Navigation, &c.

Can literature and science afford to quarrel? Surely not. What could the scientific man do without a literature to suggest and judge his thoughts, to enable him to store up the results of his researches, and to diffuse with rapidity and efficiency the fruits of his labours?

But if literature has conferred power on science, surely the benefit has been returned with usury. Does a great man worthily express thoughts influencing the destinies of nations, they are flashed or expressed in black and white in print within a few hours all the world over by the most perfect representative of science, the electric telegraph. I have myself in San Francisco, on the shores of the Pacific, at breakfast, enjoyed the reading of the speeches of the night before in the House of Commons.

We need only glance at our walls to be reminded that amongst our old members were worthy labourers in literature. Col. Hamilton Smith, by his writings on natural history, will not soon be forgotten; Dr. Tregelles, by his contributions to Biblical lore, has made his mark for all time, on the national literature. Who that had the privilege to listen to the discourses of Wightwick, of

St. John, of Luney, of Smith, of Nicholson, Rooker, Charlton, and many others here, can forget that there were men of mark amongst us who well helped in making the history of our Society.

One portrait on our walls reminds me that we have also had with us practical literary men, who have done good service in promoting the improvements in our present state of society to which I have so repeatedly referred; I mean that of Mr. Jacobson, who was, I believe, the originator of the existing system of County Courts, by which very great benefits have been conferred on the country at large in the administration of speedy and efficient justice as well as law.

Many other very active and efficient labourers in the field of social economics have there been amongst us; but I cannot afford time for a closer review.

I do not forget that there has been, and still is, a Fine Art Department in our Society that has done good work for us and for the outside world. I do not venture to say more than a few words on the topic, because I feel quite destitute of the ability to do justice to the subject.

The fine picture lately presented to us by Sir Robert Collier, all the more prized because his own work, gives tangible proof that we still have artists amongst us; and we could easily prove by reference to the catalogues of the Royal Academy, of the Water-colour Societies, and other institutions, that they are men of mark too. But we would not forget that we have on our roll the names of Northcote, Eastlake, Johns, Ball, Cook, Norman, Colley, and others.

And now TOIΣ NYN.

What of the Present?

We have a goodly number of lecturing members, of associates, lady associates, and junior associates, honorary members, life members, and corresponding members, altogether about two hundred and twenty, amongst whom may be found men of world-wide fame. I am glad to see a good proportion of lecturing members, on whom the labour of providing lectures falls not unfrequently with considerable weight. I should be better pleased to see their numbers recruited from the list of associates; whose assistance in discussions is most desirable, but their help in lecturing still more so.

The number of lady associates is a pleasing feature in the list;

but a greater number would be more satisfactory. We have but very few junior associates. I should much like to see an active recruiting service for this section.

We have a handsome building, with room for enlargement; not uncomfortable circumstances, although we should like better, of course, a fair library, a decent little museum, and a suitable staff for management.

Thanks to our worthy and indefatigable Secretaries, we have a good programme of lectures before us, provided with that promptitude which has become so characteristic of our present administrators.

Of the eleven lectures provided, I think I may venture to classify them as follows: Social Economy, 1; Scientific, 1; Political Economy, 1; and the remaining 8 all Literary. The subjects are tempting and promising, and we may anticipate much pleasure from them, and from the consequent discussions.

May I not be excused for expressing some slight feeling of alloy to the pleasure of my analysis of the list, at finding so few scientific lectures? One thing, however, I know, that if our scientific friends will but step forward and volunteer for the second half of the session, our worthy Secretaries will be only too well pleased to enlist them.

And now

ΤΟΙΣ ΕΠΕΙΤΑ.

For the Future.

All our early teachings had a curious character of finality about them, producing a tendency to believe that the world was drawing to its end. With each new discovery new proof was supposed to be given of the truth of the supposition. Doctrines of excess of population were sagely taught, the old world was supposed to be worn out, exhausted, and unable to maintain existing population from 1825 to 1850. The locomotive and marine engine won fresh victories; rendered waste places of the earth accessible to the excessive population of the old countries; the trammels of the press were gradually shaken off, and now the light of knowledge is beginning to show how very little we yet know, and to give us some idea of how much we have yet to know. The sense of finality still lurking is rapidly passing away, spite of the recent strenuous efforts that have been made to persuade us to rest and be thankful.

The world will not now stand still, however much we may wish it;

the shadows of coming events press upon us heavily, and drive us forward. We have heavy responsibilities resting on us, and may we not take the opportunities of our coming together, for seeking counsel of each other in respect of those duties which are not the less serious because they are out of the ordinary course of everyday life? What shall we do for the future?

The most important question of all pressing for our consideration is that of education. It is daily increasing in importance. It has been taken up by the legislature, and pressed forward with much energy on behalf of the poorer classes of the population; but the middle and upper classes, with but trifling exceptions, are still left in the slough of despond. To use the words of an eminent writer, recently given in the *Nineteenth Century*,* describing "Society,"† he says, "What is the life history of these people? For the first few years of their existence they are boys and girls brought up pretty sensibly; then the boys are sent to school, where they are largely occupied in pretending to obtain an infinitesimal acquaintance with two ancient languages, and that science which has the least to do with the ordinary duties of the citizen." I quote this passage because it confirms my own view of the value of ordinary middle-class education.

If this be true, then certainly there cannot be a nobler or a better subject to be taken up by some one or more of our members in future sessions.

This is not merely a schoolmaster's question, but one of most serious interest and importance to every head of a family.

A sound mind in a sound body is certainly one of the chief, if not the greatest, desiderata in existence, and as we cannot have the one without the other, is it not our duty to seek to insure it, not for ourselves only, but also for all around us; for those around us cannot long be suffering without our partaking more or less of such suffering?

Do not the recent returns of the last few months of the mortality of our district show the necessity of obtaining and diffusing better knowledge on the subject? And ought we to be content even with a mortality of fifteen per thousand, less than one-half of what it has been here lately, when the labours of our sanitarian reformers show us an infinitely superior normal rate amongst our criminal population in our prisons, which in the time of Howard were in such an awful condition, at the other end of the scale? This is not a question for our medical members alone, some of whom have recently done us good service in this department; but as questions of political and social economy, of engineering and of architecture, are all involved, there are rich fields open for our members here.

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* *Nineteenth Century*, May, 1878, page 810.

† *i.e.* those in the ring of society.

We have members of the legal profession amongst us; we have work left for them to do; and there is unhappily ample room still left to gain laurels in the field of jurisprudence. We want them to help us and themselves, and to help them to obtain for us justice, and not law. Surely there may be some amongst us able and willing to undertake for this good end.

Questions of political economy are pressing us on every side. There is quite a dearth of practical information. Who will take up the questions of free trade, of colonization, emigration, and immigration; of strikes, of trades' unions, of poor law administration, of sanitation, of municipal government, of land tenure?

It has been suggested that the phonograph will supersede the necessity for teaching two out of the three R's—reading and writing—inasmuch as it will be sufficient to speak to our little machine; and it will write down the words in its own characters, and when we want to know them again, we may hear the words with our ears, without our using our eyes to see and to read. Fancy, what a store of energy will be set free for other enterprises yet unthought of, if it really come to this, that we shall no longer want to spend a goodly portion of our life in learning to read and to write?

What next? It has already been announced that there is a probability of being able to see by telegraph; and again, while writing this I have received information from New York that Edison has declared that he has solved the only remaining difficulty in the way of introducing electricity instead of gas for lighting, not only public, but also private houses, and so accomplishing the work of our old friend Jonathan Hearder.

The progress and improvement in the conditions of society arising from the application of scientific labours has been so rapid that social distinctions are rapidly altering by solution and precipitation.

The artizan of to-day has now always his carriage waiting at his door. For one penny per mile he can travel rapidly with comfort and enjoyment very much greater than the nobleman of a few years since could do. He can command better food, as good clothing, and superior house accommodation, and has at hand, in free or public libraries or cheap sources of literature, infinitely superior sources of enjoyment to what were obtainable by crowned heads less than a century since; but the scientific man is still at work; he cannot help working, opening new mines of discovery. Before we have had time to learn how to use the accommodations offered us by the electric telegraph, just as we are beginning to rest and be thankful, comes the sharp denouement of the discovery of the telegraphic voice—of the telephone; and while we are yet pondering over it, wondering how it was possible for man to be so long an inhabitant of the earth without discovering these wonderful phenomena, lo and behold a little box is brought to us. We are told to touch a spring, and thereupon we hear a *vivâ voce* message delivered to us from a friend who entrusted it to the little machine on the other side the Atlantic.

What next? Some say we shall be able to see by telegraph; and why not, if by microphone our hearing capacities be magnified sufficiently to appreciate the ticking of a watch one hundred miles away, or to hear the breathing and the walking of a fly at the same distance?

And there is yet another branch of literature that has to be occupied. We want the aid of our theological and mental philosophers to aid in the interpretation of these wonderful manifestations.

If when they, with us, see that we appear to be on the eve of discoveries which may enable us to open the ears of the deaf, to give sight to the blind, and to make the rough places of the earth smooth, surely they will not continue to tell us that religion and science can possibly be opposed. Will they not come forward and work with us, and help us to the discernment aright of the great First Cause?

We want their help. We hope they will continue to give it. Of their abundant kindness have they not some to spare for the devotees of science, in their flightiness from the effects of the new wine of knowledge?

I cannot close without a word of appeal to our younger members to come forward into the list of lecturing members; or at least, if they cannot do that, as a first step towards doing so, to join more freely in the arena of discussion.

It may be, to some at least, hard work to begin, but so has it been to the old members; and the harder the work the better the pay.

In the very imperfect review of the labours of the past on the part of our old members who have passed away to join the great army, I hope I have been able to show example worthy of imitation. Although what we are doing may appear to be exceeding small, have we not seen that small beginnings may lead to great ends?

Let us all keep our Society's motto steadily in view, and determine to do as well as our predecessors, or as well as we can,

ΤΟΙΣ ΝΥΝ ΚΑΙ ΤΟΙΣ ΕΠΕΙΤΑ—

For the Present and for the Future.

SOME FACTS AND OPINIONS RESPECTING THE USE OF ALCOHOL.

ABSTRACT OF PAPER BY THE REV. HARRY OXLAND.

(Read October 10th, 1878.)

THE lecturer in his introduction gave a definition of the term "alcohol," referring to the scientific and popular uses of the word, and indicated the presence and proportion of alcohol in various drinks. Alcohol was a natural growth, as well as an artificial distillation. It had a twofold action on human organism—(*a*) stimulant, (*b*) narcotic—and it was important that this distinction should be noticed. Passing to consider the antiquity of the use of stimulants, the lecturer noticed the drinking propensities of the earliest races of mankind, including the ancient Chinese, the earlier inhabitants of India, the ancient Hebrews, the ancient Egyptians, Greeks, and Romans.

The general question was treated under three heads: I. The scientific aspect, or what physiology, chemistry, pathology, and the general experience of the medical profession teach us respecting the legitimate use of alcohol. II. The *social aspect*—(*a*) How far the *facts* connected with the drinking habits of the people demand the attention of the social reformer; (*b*) What *society* (as distinct from the legislature) can do to ensure the legitimate use of alcohol. III. The *legislative aspect*—To what extent the State should interfere to enforce sobriety among the people: (*a*) Legislation as regards the sale of drink; (*b*) Legislation as regards the consumer.

WEATHER AND WEATHER CHARTS.

ABSTRACT OF PAPER BY DR. MERRIFIELD, F.R.A.S., F.M.S.

(Read October 17th, 1878.)

USES of a knowledge of weather to sailors, to miners, to the sanitary engineer, and to the agriculturist. Difference between weather and climate. Description of instruments used in forecasting weather. All natural phenomena follow a law. The law of cyclones. Buys Ballot's law. Scott's gradients illustrated, and use explained in showing the force of the wind. The Beaufort scale for wind. The readings of the barometer at one station no safe guide in forecasting weather, illustrated by examples. Isobars explained, and direction of the wind shown to follow the isobaric curve, whilst the force of the wind is shown by the crowding of the isobars together. Isobars in cyclones and anti-cyclones shown, and weather deduced from them. Veering and backing of the wind shown to follow from the position of the cyclonic or anti-cyclonic centre. Path of a storm modified by the contour of a country, illustrated. Modification of path also shown from the proximity of an anti-cyclonic centre. The use of the telegraph in forecasting weather. Difficulty experienced in England in forecasting weather, and contrasted with other European countries. The advantage of England to these countries, because lying in the storm-path from the Atlantic. American storm warnings to England not reliable, as shown by Scott's table, taken from the *Mercantile Magazine.* The Gulf Stream the breeding-ground for British storms. Why veering of the wind should give stable, and its backing unstable weather in England. Mr. Meldrum's connection of sun-spots with rainfall.

THE LIMITATIONS OF "FREE TRADE."

BY THE REV. W. SHARMAN.

(Read October 24th, 1878.)

NOTES ON LOCAL ETYMOLOGIES.

ABSTRACT OF PAPER BY MR. R. N. WORTH, F.G.S., HON. MEM.

(Read October 31st, 1878.)

The oldest place names in Devon are Keltic in origin, and, following the usual rule, are those of the larger rivers. Of the smaller some are Keltic, some Teutonic, and a few are mixed. We are struck at the outset with a very remarkable group—the Tamar, Tavy, Taw, Torridge, and Teign. In each and all we find the same root, which appears in the names of the Thames, Tees, Tay, Tweed, Taff, and many other rivers, a generic Keltic word for water, which we may take as *ta* or *tau*. For want of recognizing this relationship there has been much confusion and inconsistency in the attempts to deal with these names. Tamar has been derived from the Gaelic *tamh*, "gentle." Treating the root-word as meaning simply "water," we find that the final syllables in Tamar, Tavy, and Torridge, are nothing more than distinctive suffixes in the later Keltic Cornish. The Cornish branch of the Kymry treated this *ta* and *tau* as a proper name, and proceeded to distinguish one *tau* from the other by suitable affixes. Ta-*mar* is simply Ta-*mawr*, the "big Ta," or "water;" Ta-*vy*, Ta-*veor*, the "little Ta." In the *Taw* we have the root untouched; but Tor-*ridge* is Ta-*rhyd*, the "ford Ta," from the ford, *rhyd*, by which it was crossed by the Romans, a little above the present Bideford bridge. The Teign may be the "icy" or "cold Ta," *eign* having that significance.

Every river within the Plymouth district has a name of Keltic origin. The Avon is from the root *afon*, "water," one of the commonest of Keltic river names. The Erme is doubtful; but Polwhele blundered sadly when he traced it to the East, and held it to be indicative of *Arme*nian colonization. Chapple's *iar*, "a river," and *am*, "water," though ingenious, is almost equally beside the mark.

The Yealm presents a curious example of reactionary corruption. It is without doubt from the Kornu *hayle*, "a river." The oldest recorded name is *Yale*. The modern name arose purely from the fact of the Yale having given name to Yale-ham-tun, the "enclosed dwelling on the Yale," which we now call Yealmpton. The *ham* being lost in the contraction, the word has been read as "the tun of the Yealm." The same thing happened at Walkhampton, where a feeder of the Tavy is made to rejoice in the odd name of Walkham. The river is really the Walla, a common name for Dartmoor streams (perhaps from the Kornu *walla*, "lower," though Mr. C. Spence Bate, F.R.S., with more likelihood, takes it from the Kornu *wheala*, to "work"—*i.e.* in the tin streams), and its valley the Walla-*cwm*. The *tun* of the Walla-cwm became Walkhampton, and the river the Walkham.

"Plymouth" is, historically speaking, a very modern name; moreover, it is doubly corrupt. If there ever was a Keltic Plymouth even its name has passed away. There was once a Tamarworth, which may or may not have been the little seed which has grown to such respectable dimensions. *Worth* does not appear in the old couplet—

> "In ford, in ham, in ley, and tun,
> The most of Saxon surnames run;"

but it, and its derivative *worthy*, occupy a peculiarly important position in our Devon place names. It is diversely interpreted a possession, farm, court, place, fort, and isle. The latter is probably the meaning here, and if so, the chances are that Tamarworth was the Saxon name of Drake's Island. We have *worth* still at Inceworth, a reduplicant. *Ince* here, and in Ince Castle, is the Kornu *enys*, "an island," which the Saxons in the former case took for a proper name, and tacked on "worth" to it as a generic explicant. Sutton, by which name Plymouth undoubtedly was known for centuries, is pure Saxon—"South Town." Mr. Spence Bate's discovery of the Romano-British cemetery near Turnchapel proves the existence on the shores of the Sound of a large Keltic community. I do not think it altogether improbable that its site is pointed out by a still-existing name in the parish of Plymstock—Wixenford, near Laira Bridge, which we may derive from *gwicca hen*, the "old village," with "ford" added in later times.

There has been much controversy whether or no there is such a river as the Cad. I hold that the belief in the Cad has arisen purely from the corruption of Cadworthy Bridge into Cadover Bridge, then read naturally enough as a bridge over the Cad; whereas Cad here is merely the Kornu *coed*, a "wood," and has nothing to do either with the river or with a battle presumed to have been fought upon its banks.

Nor do I believe in the Plym. The oldest form of the word is not Ply*m*, but Ply*n*, and "lin" is the Kornu *lyn*, a "lake" (not the Saxon *hlynn*, a "stream," which we have in the Lyn river). The estuary of the St. Germans river is the *Lyn-her*, or "long lake;" and the P in Plyn may stand for *pen*, and thus give us the "head lake," or "head of the lake," if, as is possible, Plympton is the older word. In Domesday we find "Plintona," not "Plymptona;" while Plymouth, then, had never been heard of. The oldest form of Plymouth is *Plin*mouth, a word which in the course of time would by necessity of speech be converted into *Plym*outh. That once done, and the older use of the name forgotten, the inference that Plymouth stood at the mouth of the *Plym* river and not at the mouth of the *Plin* estuary would be irresistible. We find both Pelyn and Pelynt actually in use in Cornwall at the present day, and both pronounced as monosyllables. Mr. J. Brooking Rowe, rightly arguing against the idea that the *river* as such gave name to Plympton, was inclined to regard the prefix as a clan name, and to find it also in *Plym*tree and allied names elsewhere. In Plymtree, however, I believe we have simply *Plum*tree; as we have "Longtree" in Langtree, "Appletree" in Appledore, "Crabtree" in Crabtree, "Hive" or "Hightree" in Heavitree. In neither of these cases is the "tree" the well-known Kornu particle, which is *never* used as a suffix.

What, then, is the original name of the Plym? I believe that Laira and Plym have been exchanged. It is quite true that *Llar* is "overspreading" in Kymric, which, with *wy* or *gy*, "water," would very well apply to the Laira as it is; or we may take the Kornu *le*, a "place," and *ryn*, a "channel." I have come to the conclusion, however, that the Laira is the true river name.

Chapple, nearly a century since, suggested that Meavy came from *mwy*, "enlarged or augmented water." *Mui* means "greater" in Kornu. The *y*, with which the names of so many of our smaller rivers end, may be either the Kymric *wy*, Kornu *gy*, or Saxon *ea* (whence "Yeo"), each of which simply means water. I do not regard it as a diminutive. Meavy thus would be "the greater water." What, then, is Laira? This is a very modern form of a word which first appears as Lery. *Le* is Kornu for "lesser;" and as Penlee is "the lesser headland" (Pryce) in contrast with the

Rame Head, so the Lery is the "lesser water" in contrast with the Meavy or Mewy.

But our Keltic names are not confined to our rivers. There can be no question that the derivation suggested by the Rev. W. Beal, for Kinterbury, is correct, and that we have here the word *ceann*, *cant*, "a headland," which gave name to Kent, and which occurs also elsewhere in the county; *i.e.* at Countisbury, and Kentisbury—other forms of Canterbury—and at Kentisbeare. Pennycomequick is with equal certainty "the head of the creek valley;" *Pen-y-cwm-cuick*. Pennycross = *Pen-y-craes*, "the head of the cross." Manaton = *Maen-y-dun*, "the stony hill." But I hesitate to accept Mr. Beal's ingenious suggestion that Knackersknowle should read *Na-caer-ill*, "the hill camp;" or, *Cnoc-cair-coill*, "the grove camp." Knowle is a good old Saxon word for a small rounded hill; and we have Honicknowle also to account for. Can these be two names of possession with a Keltic element? Dinnacombe, in Cornwood, gives us *dinas*, "a fortress." Goodameavy is "the wood of the Meavy"—*coed* = wood. We have Penquite in Modbury = *pen-coed*, "the head of the wood;" and Good-a-moor is either "the moorland wood," or "the great wood" if moor here = *mawr*. Fenton in Plympton is pure Kornu for "a spring" or well; and "Voss" in the same parish = Kornu for "maid." Goosewell seems so simple that one hesitates to suggest *gosys*, "bloody;" but we have often to distrust the very obvious. Pen Beacon everyone will recognize as Keltic in its first word. Shell Top was once called Pen Shiel; and here we have in addition to *pen*, the Norse *shiel*, "a shed or dwelling."

Whitsand = *White*-sand; but what of Cawsand and Kingsand where there is no sand, and Bovisand where there is scarce any? Sand in these cases probably stands for the Kornu *zawn*, "a little cove or creek." *Cors-zawn* would = "the creek by the moor;" *Cein-zawn*, "the creek by the ridge," if Kingsand is an old name, which is doubtful. And Bovisand?—*bod* is Kornu for house = "the creek of the house." Rame has been derived from a fancied resemblance to the head of a ram. Mr. Beal made it "the high projecting headland." There is a tempting derivation in the provincial use of the word *ream*, "to stretch." Cremyll, which Mr. Beal reads "the hill of Crom," I make "the crooked or bent hill;" *crom* = crooked. Bear in mind that the true Cremyll is on this side of the water, at the place we now call Devil's Point, from the old Huguenot refugee Duval, who once dwelt there. Cotehele is *coed-hayle*, "the wood by the river." *Penhale* is "the head of the moor;" Tregantle, Pryce makes "the dwelling of danger." Thanckes, according to Polwhele, is "house of view." Jump was formerly called Trenaman's Jump; and *gump* is Kornu for "a plain;" while Trenaman signifies "the dwelling by the stone."

Saxon as it looks, I believe Keyham is Keltic. The oldest form is simply Caine = "a ridge." Hamoaze is very doubtful. Carew derives it from *ham* and *ose*, "according to the nature of the place." It has been read "the wet oozy habitation;" taken from the hamlets, *hamaux*, that were on its banks; traced to the fact (?) that a Dane called *Ham* was drowned there. Mr. Beal suggested the Gaelic *amus* = "protection, safety;" and Dr. Bannister made it "the water border," *hem-uisg*. To me the word seems neither Gaelic, Kornu, nor Phœnician—certainly it is not French—but I am not at all sure it is not Teutonic, and probably Norse. Ham may give us *holm*, "an island," and *oaze* may be the same word which we find in the river Ouse, which would equal "the island water," the water where the island, *i.e.* Drake's, is.

We now come to names of Saxon origin. The most distinctive feature of the Saxon water names current in this locality is the word *fleet*. It is always applied to a little stream having a tidal connection. Stonehouse Lake was once Stoke Damerel Fleet. There are Pomphlett on the Plym, Coffleet on the Yealm, Flete and Pamflete on the Erme. Pomphlett and Pamflete are from the Saxon *baum*, "a tree," whence we have beam; Coffleet is simply *Cove*-fleet.

Lake is used in a special sense as a channel, in which form it is applied to some of the Dartmoor streams. Millbrook Lake has no reference to "the lake-like expanse of the waters of the creek at high tide;" it is simply the channel that leads to Millbrook. Millbrook, of course, explains itself; the associated name of Dodbrook, now almost forgotten, is more difficult.

Dodda occurs as a personal name before the Conquest, and it may have originated from the water plant *dod*, which Verstegan says in his time was called by the boys "foxtail." It is more likely that Dodbrook came directly from the plant than immediately from the personal form, Dodda.

Ford is common. Radford is "the red ford," as any one may see.

Tun, "an enclosure," whence town, appears in a large number of our local names. We have it in the oldest recorded name of Plymouth—Sutton, in Plympton, Yealmpton, Tamerton, Newton, Weston, Ermington, Compton, and many others. It is very apt, however, to be confounded with *dun*, a "hill," which, like *cwm* and *combe* for valley, was used both by Kelt and Saxon. We have, for example, Staddon Heights, Langdon, Down Thomas, all applying to parts of the same hill range.

Stocks come next to tuns in importance. A *stock* or *stoke* was an enclosure defended by palisading, "stockaded." Plymstock, Revelstoke, Stoke Damerel, Tavistock, show that in this locality the need for such protection was specially felt. *Bury* or *borough* is a word of very similar meaning, so far as the idea of defence is concerned; but a *bury* properly is an earthen camp, and thus answers to the Kornu *caer* or *dinas*. Here again we find the need of defence indicated by the prevalence of words thus compounded, such words as Bigbury, Kinterbury, Modbury, Wembury, Roborough, Ugborough, Burrough.

Ham we have in many forms—simple as at Ham in Weston Peveril, and compounded in Langham and Lyneham. I am inclined to regard these as one—"the long dwelling." Langdon is "the long hill." Staddon may give us *stead*, a "place"—"the hill place." Saltram was originally Salterham. Willcove has been read as "the well cove;" and Freathy traced to *frith*, a "wattled hedge." Swilly is a doubtful name. *Sell* is a "cot," and *Sell-ley* would be the "cot-field." Mothecombe, "the mouth of the combe." Warleigh is *wearth* or *worth*leigh; and as one of the meanings of *worth* is "a land between two waters," we see how aptly descriptive this is. Shaugh is *sceacga*, "rough coppice;" and in Sampford Spiney we have the allied word *spinney*. Maristow is really *Martins-stow*—"Martin's place." *Wick*, "an abode," we have in Hurdwick.

Wabblewall, in the parish of Brixton, is very suggestive and pure Saxon. It is "the bubbling well;" for *wabble* means to "burst out—bubble." In Colebrook we have the Saxon *coln*, "a pebble," "the pebbly brook."

Hoe is a notable word, though simply one form of Saxon for high. We have it also in Hooe; and in North Devon it appears in Morthoe, Martinhoe, Trentishoe; at Dartmouth it once existed in Hawley's Hoe. Names and prefixes descriptive of situation are very common. Harford is "the higher ford;" Horrabridge, "the higher bridge;" Whitchurch is "the white church." Many names are derived from rivers; several instances have already been given. Others follow trees. Bickleigh is "the beechleigh," or field. *Ing* is Saxon for a meadow, and is the *pratum* of Domesday as *ley* (leigh, lea) is the *pasture*. I do not think it is used as a clan affix in any Devon place-name. Ermington I read, "the tun of the meadow by the Erme."

But we have to deal with other than the Saxon branch of the Teutonic family. There is ample evidence that the mingled company of Scandinavians, commonly classed under the general name of Danes, had from time to time a great deal to do with this part of England; and that they not only made raids, but effected settlements. Such Norse forms as *beck* for "brook," and *gill* for "a ravine," occur in different parts of the county; and Mr. Spence Bate has shown that there are Scandinavian name-traces even on Dartmoor. Mr. Isaac Taylor would make this county very Danish indeed. The most noteworthy affix connected with that class of our place-names which has reference to trees is the constantly-recurring *beer*, which is found in the varying forms *bera*, *berah*, *beer*, *bear*, and *bere*. Mr. Taylor treats this as identical with the Danish test word *by*, which would make Devon rather more Danish than the counties of the Danelagh. It is not difficult to show the historic baselessness of the suggestion. Elaborate argument, however, is not needed. The word is the Saxon *beera*, "a grove," and its abundance is an indication of the wooded aspect of Devonshire in those distant days. The only *by* I know is Huckaby, in Lydford. Again there is the name of Wembury, which Mr. Taylor regards as connected with the ancient mythology, referring it to *Woden*, as he does Satterleigh to the god *Sætere*.

It is singular that in both these names we should indeed have evidence of the Scandinavian, but in quite a different direction. While we have so good a Norse etymology as *seter*, "a dwelling, or seat," for Satterleigh there is no need to go further afield; and as for Wembury, instead of implying "the existence of a mound or other erection dedicated to Woden," it is one of our most interesting and valuable historical links. The oldest form of Wembury is Wicanbeorge. *Beorge*, of course, is "bury," and *Wican* is *wiceng*, or "viking." Here then we have "the Viking's earthwork," a distinct proof yet subsisting of the truth of the tradition that it was at Wembury that Ceorl, ealdorman of Devon, defeated the Norsemen, in 851. And Revelstoke bears out this view if we may derive revel from *reafere*, a "rover, robber." *Reafful* = "rapacious." It is impossible to resist the conclusion that these two names are thus associated. Both the *bury* and the *stoke* speak of defensive works; both the *Wican* or Wem, and the *Revel*, connect these works with the visits of marauders.

What we are looking for, however, is the evidence of Norse settlement. An unmistakable proof of this is the occurrence all along the south coast of *ness* for "headland." Permanent names are not given to localities by casual visitors. We have "ness" within the limits of our own harbour. Ravenness Point is distinctly Norse in its character, though, as I am not prepared to say what its antiquity may be, it would be unwise to attach too much importance to it. There can be no doubt however that we have "ness" in Noss, the little village on the Revelstoke side of the Yealm inlet; and its antiquity is well attested by the fact that the village on the opposite side, which by the patronymic attached we can date back to Norman times, is in distinction called *Newton.*

But we need not stop here. We have in the name of our noble bay, and in that of one of its chief, and in early days its most important inlet, other evidence of the Norsemen. I do not say that *Sound* is distinctively Scandinavian. It occurs in Anglo-Saxon, as applied to a narrow arm of the sea; but it is more frequently used in this sense in the North, and is rarely employed in this country. Moreover there is some weight to be attached to the notable fact that here in Plymouth we have the Sound and the Cattewater, as in Denmark the Sound and Cattegat. Cattewater has always been one of the local difficulties; and has as many etymologies as Hamoaze. It has been associated with the chapel of St. Catherine; has been treated as the *Cad*water, after the non-existent river Cad. We find the word so far back as the fifteenth century, given as a borough boundary, as "the Catte of Hingston." This Hingston was what we now call Cattedown; and had its original name in all probability from a hanging stone or cromlech. Catte, I believe, is from a similar root to gut—Anglo-Saxon *gut*, *geotan*, "to pour, flow"—which is found in varied forms in the other Teutonic languages; or it may be connected with the Icelandic *gat*, "a hole," and our own gate, "a passage;" Cattegat gives both. In either case it would be equivalent to Hingston Straits, or something of that sort. When the original idea of gat as a narrow passage for water was lost, and the hanging stone no longer existed, then the Catte of Hingston became Cattewater, and Hingston itself Cattedown.

The only trace of Roman influence in local names is in the well-known Ridgway, and the problematical Darscott Lane, which is at times called Dark *Street*, and treated as akin to Stratton.

Let us turn now to a few names of the most distinctly local type. Stonehouse carries us back to the days when the lord lived in his timbered strength and the vassals in their huts of mud and wattle, and a house of "stane and lime" was a thing that the ancient Captain Cuttles, "when found," most rigidly "made a note of." Devonport is of course "the port of Devon," a very much more important name than the purely subordinate one of Plymouth Dock, which is a contraction of the original phrase, "the dock at Plymouth," the village of Stoke being too insignificant to give name to anything bigger than itself.

Longroom takes name from the "long room" still extant, built there in the last century, when the gardens around were the local Ranelagh or Cremorne, and the resort of the beaux and belles of the Three Towns, who considered them quite in the country. Eastern and Western King have no meaning to us now except in their prefixes. King is clearly a corruption, and it may very well be of the Kornu *cein*, "a ridge." Millbay is one of our oldest local names. It dates back at least six hundred years; for in the twelfth century Ralph de Valletort gave the monks of Plympton a site on its banks for a mill-dam, and there stood the mills whence the bay took its name. They were often called Surpool or Sourpool mills, the waters that stretched far and wide over what is now Union Street and its adjuncts being then called Sur Pool, or "the Upper Pool," to distinguish it from Sutton, the Lower, Pool. Lambhay has been derived by Mr. Beal from *lamh*, Gaelic "hand," in reference to the strength shown by Corinæus when he hurled Gogmagog thence. Its oldest form is Lammy. Lamb*hay* would be merely "the lamb-field," a mode of expression very common in the east of the county. We have it as the Lammy, and Lammy Point, while now it is Lamhay Hill. *Lam* may = *lan*, "an enclosure;" and Lan-hayle would be "the enclosure on the river," or estuary. But it is impossible to decide. Castle Street and the Barbican recall the days of the foundation of the strong "castel quadrate," of which one of the entrance works still exists, and which was founded in the fourteenth century for the defence of the town against the French, who nevertheless not many years afterwards burnt the greater part. Of this event we had a memorial in the fine old historic name "Briton Side," which an ill-instructed corporation changed for the meaningless Exeter Street.

New Street in the process of time has become one of the oldest streets in the town; but it was new when Old Town Street was ancient. Yet no one had ever heard of Old Town Street sixty years ago. For centuries it had handed down under the name of "Old Town" simply, the memory of the parent community of which the Sutton of the Conquest was the offspring. Westwell and Finewell and Buckwell Streets help us to realize the days ere Drake "brought the water into Plymouth." Finewell may have been named from its quality. Buckwell was clearly the spot where the good housewives used to "buck" or wash their clothes. Blackfriars Lane for centuries preserved the memory of the house of the Dominicans, in the absence of all written record. Whitefriars Lane, Friary Court, and Friary Street, in like manner kept alive that of the settlement of the Carmelites. Catherine Street is so called because it led to the chapel of St. Catherine on the Hoe. Catte Street, which we may presume was somehow connected with Cattewater, has now given place to Stillman Street, which, however, like Bilbury Street and Whimple Street, is one of the oldest street names in the town. Frankfort Street is the sole memorial relic of the siege days, and indicates the site of Frankfort Gate.

Several names record the existence of old families. The Trevilles were notable merchants in the time of Elizabeth; Vintry Street was once called Foyne's Lane, after the still more notable Fowneses; Kinterbury Street was Colmer's Lane. Week Street and How's Lane are names of the same class.

Our personal place-names form an especially interesting group. They are mostly given for the direct purpose of distinction. The oldest in this locality is Brixton, given in Domesday as Brictricstun, or "the tun of Brictic." As a rule these personal distinctives date from Norman and indeed feudal times. Thus we have Newton Ferrers—"New-town" of the Ferrerses—in distinction to the many other Newtons of the county. Tamerton Foliott—"Tamar-town" of the Foliotts; Weston Peverill—"West-town" of the Peverills; Compton Gifford—"Combe or valley town" of the Giffards; Stoke Damerel—"Stockaded place" of the Damerels.

The two Plymptons are commonly distinguished by the dedications of their churches—Mary and Maurice; but Plympton *Erle* goes back to the days of the Redverses and its secular ownership as distinct from that of the monks. Ecclesiastical ownership is found indicated in many ways. Here we have Shaugh *Prior;* Buckland *Monachorum*, "the Monks' Buckland," a necessary distinction even if there had been no other *buck* or *boc* land—that is, "land held by deed or charter," about—than that of Egg Buckland, originally *ack* or "*oak*" Buckland. And the three Suttons which eventually merged into Plymouth, were respectively Sutton Prior, Sutton Valletort or Vautier, and Sutton Ralf. It is indeed remarkable to what an extent the old ownerships have left their mark. The Valletorts held Mount Edgcumbe long ere the Saxon Edgcumbes grafted the succession of that Norman race on to their own native stock; and Mount Edgcumbe is even yet the tithing of Vaulters Home, or "Valletort's ham." Mount Wise recalls the time when the Wises, who then owned Stoke Damerel, in rivalry of their neighbours built their barton house where the fort now crowns its rugged crest. Morice Town (New Passage when the first ferry was established between it and Torpoint) preserves the memory of the Morices, from whom the manor came to the St. Aubyns. Mount Batten takes its name from the old Parliamentary Admiral Batten, and before the Siege was known as Hoe Stert, or "tail," the same word we have in Start Point now, and in the name of the redstart. Mount Gold in likewise manner hands down the name of Colonel Gold, Roundhead governor of Plymouth, who died in harness. Fort Stamford recalls the luckless Parliamentary General, the Earl of Stamford, who was defeated at Stratton. I was once inclined to connect Prince Rock with Prince Maurice, but the name is centuries older than his time, and may record in its way the visits of the Black Prince. Tothill is undoubtedly from the Saxon *tot*, "an enclosure," and hill. Mutley is Magdalen. The old leper or Maudlyn house occupied very much the site of the Blind Institution, and the fields hard by were thence named the Maudlyn—Maudley—Mudley—Mutley—fields. This is not more singular than the derivation of Turnchapel from "St. Ann Chapel," then Tannchapel. The remains of the chapel may still be seen near Hooe. Oreston I take to be purely Saxon—"the tun on the shore"—*ora*—or perhaps "the shore-stone."

THE GIANT EXTINCT BIRDS OF THE SOUTHERN HEMISPHERE.

ABSTRACT OF PAPER BY MAJOR J. A. BRIGGS.

(Read November 7th, 1878.)

The lecturer commenced his paper by showing that the interest attaching to the distribution of extinct forms of life had greatly increased, that the subject now under consideration had engaged the attention of many eminent geologists, anatomists, palæontologists, and writers on various branches of natural history, and that but for the careful labours of such investigators many of the accounts of the early travellers and others who claimed to have seen, and had described these strange forms, when still existing species, would have been altogether discredited, while in fact many had been already set aside as purely fabulous.

This was the case with the Roc, or Rukh, of Madagascar, (*Æpyornis maxima*); for Marco Polo's account of this wonderful bird, accompanied as it was with much of the characteristic colouring of this old writer, was thought a pure invention of his imagination, whereas we now have unmistakeable evidence that such a bird has existed on the island in historic times; for not only does our own British Museum contain fragments of its bones, but also there are in various museums and private cabinets at least seven examples of the egg of this immense bird—these average more than thirty-three inches in circumference, and are capable of containing about two gallons.

So also much of Leguat's well-known and somewhat fanciful description of the 'Solitaire' of Rodriguez (*Pezohaps solitaria*) has quite recently received additional support from the examination of a number of bones discovered on that island in 1865 by Mr. A. Newton, and from which entire skeletons have been built up, showing in the main the accuracy of Leguat's account; in particular the great disparity as regards size in the sexes, and establishing the fact of the male bird having a knob at the extremity of its rudimentary wing, which Leguat assures us it used as a means of defence; in support of which assertion is the additional fact that some of the recovered rudimentary wing-bones which have this protuberance present indications of having been fractured and reunited during life.

The two foregoing examples should, it was considered, teach us to deal tenderly with the accounts handed down to us by these gossiping old travellers, and that we should be slow to charge them with wilful deception, for we ought not to forget how largely the marvellous was commonly accepted by them. Assertions were received by them with but partial examination, and were retailed in thorough sincerity, the narrators evidently believing in their absolute truth.

Mention was next made of the celebrated Dodo (*Didus ineptus*), of which until quite recently the few osseous fragments below enumerated were the only reputed remains. A head and foot in the Ashmolean at Oxford; a leg in the British Museum; a breast-bone in Paris; a skull in Prague; and a beak and skull in Copenhagen. After reviewing the history of the British Museum and Oxford relics, and other evidence of a pictorial nature, notice of this bird was concluded with mention of the important discovery of Dodo's bones by Mr. George Clarke of Mauritius in 1865, of which an interesting account was shortly after sent by him to the *Ibis*. The result of an examination of the most perfect set of these bones by Professor Owen, appeared in a paper in *Proceedings of Zoological Society*, for 1866, by which the most wonderful organization of the Dodo's skeleton is abundantly confirmed, and its columbine affinities, originally suggested by Professor Reinhardt and Mr. Hugh Strickland, are established.

The Dinornis, the gigantic Moa of New Zealand, was next noticed; a bird which—unlike the Dodo and the Solitaire—had no contemporary pen to describe it; for even had not Tasman been scared from the shores of Cook's Straits by the hostility of the Maories in 1642, it is questionable whether he would have been in time to have seen a living Moa, or to have feasted his crew on its flesh; as we know about this same time the Dutch voyagers, to and from Batavia, feasted theirs on the helpless Dodos of Mauritius. But however this may be, it is pretty certain that the Moa must have succumbed to its fate long before Cook visited almost every part of the coast of both North and South Islands in 1769–70; indeed the earth retained alike their bones and their secret, until it was proclaimed by the voice of science from the other end of the earth. This was done by Owen in 1839, from the fragment of a bone given him by Mr. Rule for examination, with the statement that it was found on the east coast of New Zealand. Since this date a very large number of bones have been collected from both North and South Islands, and have been submitted to the same celebrated anatomist, who has been enabled to determine no less than fifteen distinct species, some of them being common to the two islands whilst others seem confined to one only.

After speculations as to the cause of the rapid extinction of the Moa, a few of the characters peculiar to the skeleton of Dinornis were noticed, as taken from Owen's celebrated papers on the genus, showing that the form and structure is so peculiar as to be referable to no known family.

After a brief notice of the other extinct brevipennate birds of the Southern Hemisphere, the paper was brought to a conclusion with a few remarks on the distribution of these anomalous forms of life, the first thing noteworthy being the circumscribed area over which they ranged, for an explanation of which the geological record is consulted in vain, for as yet an examination of the earth's crust has revealed nothing beyond the fact that the entire absence of indigenous mammals from their area is one that has always prevailed.

Owen seems to favour the opinion of many scientific speculators who think that we have in New Zealand a portion of the earth which has been longest upraised from the ocean of any part of its surface; whilst a favourite hypothesis with some is the existence, at one time of the earth's history, of a vast southern continent, devoid of mammals, and stocked with kindred forms of life to those which we have been considering, and which is now altogether submerged with the exception of those islands.

Lastly, the disciples of Darwin and Wallace might see no necessity for any of these surmises, but might assume that a common progenitor of these brevipennates had at some time existed possessed of powers of flight, enabling it to transport itself at will over vast spaces; but when, through change in surrounding conditions, and having no longer any enemy to dread or migration to accomplish, those powers of flight became no longer advantageous, they may have gradually disappeared, and the race have had time to differentiate itself into those very numerous species we now find dotted over several widely-separated islands of the Southern Hemisphere.

ENGLISH LITERATURE FROM THE ELIZABETHAN TO THE VICTORIAN ERA.

ABSTRACT OF PAPER BY MR. T. A. CRAGOE, F.R.G.S.

(Read November 14th, 1878.)

The lecturer, after remarking upon the different schools of literature which distinguished the seventeenth and eighteenth centuries, touching lightly upon the vexed questions of "Ossian," "Rowley," and the "Letters of Junius," and observing that Macaulay's spiteful Essay made it fashionable for pitiful critics to shower down unmerited rebukes upon the memory of James Boswell, concluded by saying, "Does any one suppose that the capacity of man's mind expands with the ages—that the intellectual grasp is greater now than it was many generations ago? Rather, is there not more bark for the mind in some of those grand old authors who have long since become 'the mighty dead'? What shall we say for 'words that wise Bacon or brave Raleigh spoke'? The modern advance of art and science has depended mainly upon the fact that with the comparative peace of recent centuries we have a long unbroken roll of scientific record. Science is cumulative in its nature; one man adds to another man's invention, till the many cogs of the wheel are all placed. Lord Bacon invented neither telegraph nor telephone; but he did more—he taught the world how to philosophize, how to conduct all scientific enquiry. The present age is too much given to superficial reading. A pampered appetite blasphemes brown bread, and yet that is the true *pabulum* after all. So the emasculated mind, long accustomed to skimming the surface for the cramming of unlawful delights, flies off from salutary exercise, and becomes enfeebled and demoralized, so far as healthy thought is a factor in deploying the powers of the soul. In short we run at railway speed—there is no time for reflection. The Selborne naturalist tells us the antlers of stags formerly grew larger because those animals were disturbed less. Is it not possible to disturb and distract man's mind till it dwindles down to a mere core of selfish cunning? We know of no estimate more disparaging to our own times than Charles Kingsley's remarks in his preface to Brooks's *Fool of Quality*. He asks why it is such chaste and noble sentiments, couched in such unrivalled language, should be so long neglected; and he plainly hints at the reason. It is not because our generation has outgrown the calibre of the ideas of this fine old work, but simply because the flood-tide of popular taste does not rise so high. Bookshelves now adorn the cottage-homes of England where reading was once unknown; and the poor man's children can read, and they do read a great deal of poor stuff in the periodical literature, but upon the whole the cottages have gained. Yet the wealthy, middle, and trading classes have not now that genuine love for reading which prevailed in the land a hundred years ago, when lines from *Thompson's Seasons* and *The Deserted Village* became household words. And this is undoubtedly due to the scattering of domestic thought, and the general dissipation of the public mind through the facility of travel; in other words, it is due to the railway which girdles the globe. Home was once more emphatically home; life had to be lived there; and the mind had time to settle down to steady thought and fixed pleasures. The standard works of old England are not fingered much by the generation in which we live; and although it is fashionable to take home the latest book of promise, it is not the fashion really *to read* it. And upon the whole, notwithstanding the increase of books, we can't help believing the middle classes are falling away—have fallen away—from their literary tastes. That household god, the piano, may have something to do with it; but surely it is of more importance to educate the heart than the ear. The accomplished daughters of a clergyman lately assured us they considered the *Vicar of Wakefield* an unreadable book! They remembered something about a gross of green spectacles, but had not penetrated so far as the sermon in the prison. Can we suppose these young ladies ever looked into *Paradise Lost?* When Laurence Sterne served the parish of Sutton, the leading families of the county assembled at York to pass the gloomy hours of the winter solstice. In the county-town there was yet time for the mind to dwell upon home pleasures and home studies; excitement could hardly stifle reflection. Now, that same class from Yorkshire, and from every county in England and Wales, betake themselves to the grand vortex of London life. Are the nobility and gentry of the land generally imbued with that literary taste which distinguished the age when Elizabeth Montague, Mrs. Boscawen, Mrs. Barbauld, Elizabeth Carter, and Hannah More, tried the keen encounter of their wits with the brilliant scholars of a most brilliant period? Go back two centuries farther. Are the upper classes now generally imbued with that taste for reading which embellished the early and later Tudor times—when good Queen Bess handled Greek, and all that was good, and all that was intelligent, gathered round the heart and head of Margaret Roper? when books were scarce,

> 'When princes and kings received the wondrous gift,
> And ladies read the work they could not lift'?

However, when we come to scholars as a class, there are scholars now as thorough-paced as ever; and a more happy sign of the times lies here. The intense intellectual applications of the leading spirits of the age have wrought out a liberality of creed, and a magnanimity of thought, of which Tennyson's *In Memoriam* is a representative poem. Faith, Hope, and Charity may no longer run in a groove."

THE ENGLISH LANGUAGE IN THE LIGHT OF MODERN SCHOLARSHIP.

ABSTRACT OF PAPER BY MR. SLATER, M.A.

(Read November 21st, 1878.)

The object of the lecture was to popularize some of the more important results of philological investigation, especially so far as they illustrate the English language. The lecturer proceeded to discuss the subject as follows:

The three chief theories respecting the Origin of Language; its "how;" of words, stems, and roots. The Bow-wow and Pooh-

pooh theories. Language; its matter and its form; of presentive and symbolic words. The importance of the English language; its gradual spread, and present extent.

Definitions of the terms of the lecture. Of the scientific classification of languages, and the discovery of Sanskrit. The kinship of the various branches of the Aryan family proved by an examination of their grammar and their roots; of "lautverschiebung," or the dislocation of consonants; of primitive Aryan civilization (from Peile); of the Semitic languages; of the Turanian family, and of the Accadian; the Isolating family.

Terminations in the Amalgamating languages originally distinct words.

Of the propriety of the term Anglo-Saxon as applied to the earliest stage of our language. Characteristics of Anglo-Saxon as compared with Modern English. Of so-called irregularities in English grammar; of "umlaut;" *men*, plural of *man*, not irregular. Of English double plurals (Ex. children). Dr. Murray's theory. Of "ablaut and reduplication." Of English causatives in 'ya' (Ex. *lay* from *lie*). Of the Passive voice in English.

Modern societies for the encouragement of the study of English; recent works on the subject.

Practical remarks: It was recommended on considerations of utility and historical accuracy to distinguish in pronunciation between such pairs of words as *whale* and *wail*, *which* and *witch*, *whither* and *wither*, &c.; that in such forms as *sang* and *sung*, *drank* and *drunk*, we should improve on Anglo-Saxon by limiting the former to the past tense, and the latter to the participle; and that the utmost endeavours should be used to keep alive the Subjunctive mood. Of the love of finery; of the love of exaggeration; of slang. The possession of the English language a sacred trust, and our duty with respect to it.

ENGLISH DIALECTS.

ABSTRACT OF MR. J. SHELLY'S PAPER.

(Read November 28th, 1878.)

We hardly realize without some consideration how different is the language spoken in different parts of our country. A Yorkshire and Devonshire peasant may both be able to read a page out of the *Pilgrim's Progress*, but if they were to meet face to face they would not be able to understand each other's talk; probably neither of them would be able to understand the book if he heard it read by the other. The dialects differ from standard English and among themselves, not only in pronunciation, tone, and accent, but also in their vocabulary and grammar. They are in fact different though nearly-allied languages, having a history, and many of them a literature of their own. Their origin is involved in obscurity, but is probably to be sought in the home of the English people before they came into this country. It is probable that the two dialects of which we find evidence in our literature before the Conquest—the Northern and Southern—arose from the North having been peopled mainly by the Angles and the South by the Saxons. The settlement of the Jutes in Kent may have caused some of the peculiarities of the Kentish dialect, formerly much more marked than at present. The various invasions and settlements of the Danes in the north-eastern, and of the Normans in the southern and midland districts, no doubt affected the speech of the people. In the thirteenth and fourteenth centuries we find three dialects noticed—the Northern, spoken from the Humber to the Firth of Forth, over an area corresponding nearly to the old Northumbrian kingdom; the Midland, in the Midland and East Anglian counties, and in the district west of the Pennine range, corresponding to the kingdoms of Mercia and East Anglia, and the Welsh kingdom of Strathclyde, which was probably peopled from Mercia; and the Southern, in the counties south of the Thames and in Somerset and Gloucester, corresponding to the kingdom of Wessex. Of all these three dialects we have distinct literary remains; *e.g.* in the Northern dialect, Rolle's *Pricke of Conscience* (about 1340); in the Southern dialect, Langlande's *Vision of Piers Ploughman* (about 1362); and in the Midland dialect, Sir John Maundeville's *Travels* (1356). We have a contemporary account of these dialects in Trevisa's translation of Higden's *Polychronicon* (1387). The dialects were so distinct that translations were made from one to another. In the fourteenth and fifteenth centuries the Midland dialect became established as the literary language, the language of the court and of educated persons. The position of London and of the Universities had no doubt much to do with this. The eminence of the writers who used this dialect—Wiclif, Gower, and Chaucer—perhaps had still more. The introduction of printing at the end of the fifteenth century contributed to establish and maintain the uniformity of the literary language. This then became the standard English; and accordingly we find at the present day that the language of the people in and about the county of Huntingdon hardly varies from the received pronunciation. This is the true home of our standard English. Notwithstanding the establishment of a literary language, the dialects still continued to be spoken. They are noticed by Puttenham (about 1589), and are used by the dramatists; *e.g.* Edgar, in *King Lear*, speaks as a Kentish peasant of Shakspeare's time; and in Jonson's *Sad Shepherd* we have a specimen of the Northern dialect. The Northern dialect continued to have a rich literature; for those whom we commonly call the Scotch poets are really Northern English in their language. Barbour, Wyntoun, Dunbar, and James I. of Scotland, always call the language in which they wrote English; Dunbar addresses Chaucer as "of *our Inglisch* all the lycht,

> Surmounting eviry Tong terrestriall
> Als fer as Mayes morow dois mydnycht."

Latterly in Edwin Waugh the Lancashire variety of the Northern dialect has found a poet whose verses have attained a more than local fame; and Mr. Barnes has used the Dorset variety of the Southern dialect in still sweeter verse; while Tennyson, in his *Northern Farmer*, has used the East Midland—the Lincolnshire dialect—with a master's hand, and has given a bit of the Oxfordshire dialect in the conversation between Joan and Tib in *Queen*

Mary. Still, however skilfully employed here and there by poets and novelists, the dialects are now no longer literary languages. They exist in real living use only in the mouths of the peasantry. Even this use of them is yielding to the continual encroachments of the standard English and the assaults of the schoolmaster. A rapid change is going on. A person who was brought up in East Lancashire tells me, that when he returned home after rather more than twenty years absence the dialect had so changed that his brothers hardly understood the old dialect which he remembered and was still able to speak. He remembers the use of three forms, that used in his childhood, the form now used, and an intermediate form; *e. g.*—

1840.	1855.	1877.
Thocht	thowt	thought
Nicht	neet	night
Rocht	reighked	reiched (reached)
Shooch	shuff	shoe

Many old words and idioms are being lost—‘’ch’ for ‘I;’ *e.g.*, ‘’chill,’ ‘’chould,’ which we find in the *Exmoor Scolding*, is now quite extinct in Devon. ‘Utchy’ is said to be still used near Crewkerne, in Somerset.

The English Dialect Society was established in 1873 for the purpose of noting and preserving what remains of these old forms of speech. It has done good work in issuing an excellent bibliographical list of works published, or known to exist in MS., illustrative of the English dialects, reprints of scarce glossaries, and several original glossaries. There is still a good deal of work to be done. It is hoped, however, that the whole of the work contemplated may be accomplished within the next four or five years. Mr. A. J. Ellis's general survey of the pronunciation of English dialects, to be included in the forthcoming fifth part of his *Treatise on Early English Pronunciation*, will greatly aid the labours of the Society, and lead, it is hoped, to a more exact and thorough knowledge of this interesting department of philological study than has been possible hitherto.

THE RATIONALE OF THE DISTINCTION BETWEEN MATTER AND MIND.

ABSTRACT OF PAPER BY PROFESSOR CHAPMAN, M.A.

Read December 5th, 1878.

THE object in view in this discussion is to indicate the lines along which a satisfactory account may be found of the distinction which is ordinarily made between the essential nature of Matter and of Mind.

The fact that the majority of great thinkers of ancient times did recognize the distinction and based their systems on the then generally admitted truth, is adduced not by way of evidence, but to indicate that men regarded it as fundamental. At the same time, if there is any value in the concurrence of most of the acutest reasoners of the past, the natural issue is, that those who now are inclined to deny or question the conclusion thus held must in all fairness accept the burden of proof.

The profound mystery which every thoughtful man feels in the conscious existence of a nature that can assert its power in the presence of a complicated universe, and even debate its own reality, was appreciated by the profoundest intellects of India and Greece. This it was that gave impulse to their endeavours to penetrate the darkness and solve the riddle of life. The culmination of these early efforts appears, perhaps, in Plato's characterizing Matter as rather a negation of reality, and Mind as being a spontaneous energy and formative influence. The indeterminate substratum, under the potent action of this positive formative power, issued in a Kosmical Phenomenon. The Platonic conclusion, not being based on scientific analysis as applied to physics, has little weight with those who hope to ascertain all truth from purely physical researches; but nevertheless the sharp antithesis thus enunciated has not been set aside. It is significant that the more logical Aristotle worked out his physics and metaphysics to essentially the same conclusion;

for he not only argues* that the prime cause of the evolution of simple Matter must be other than Matter, but he goes on to say that the only rational conclusion to which we can arrive is, that, in its nature, it is one and the same with Mind. (Met. xii. 7.) The fact that the Democritan School took a reverse view only establishes the truth that they dissented from the generally recognized doctrine.

Passing by the Dualistic and Monistic doctrines which have found varied support, it is observable that the physical researches of late years, and the passionate desire for unity engendered thereby, have contributed to push modern thought on afresh to the enquiry as to whether Matter and Mind are but names to designate the same reality under diverse aspects. The more bold of our modern speculators even advance the opinion that the peculiar phenomena to which we give the name "Mind" are simply the products of a more elaborate molecular combination. Thought, feeling, volition, are the outcome of molecular interaction in the same sense as are the flash and smoke of a lucifer match. This is the view of Büchner, Haeckel, and Maudsley.

That the position thus taken cannot be established is obvious; for it is based on several assumptions, neither of which can be maintained. 1. That it is inconceivable that there should exist an invisible essence or centre of power devoid of physical parts. 2. That if such be allowed to exist, it is inconceivable how it can act on a material tangible mass like the brain and produce effects of a distinctly material character. 3. That if this were possible, there would be violence done to the principle of philosophical unity. 4. That physiological researches show thought and volition to depend for existence and continuity on the structure and variations in the tissue of the brain. 5. That inasmuch as the doctrine of evolution is established up to the point where the question of Mind comes in, a presumption is thereby created that evolution reaches from the primary indifferentiated Matter, up through ever increasing differentiations, to those which constitute what we know as conscious Mind.

That neither of these assumptions will hold good is made out by arguments appropriate to each. 1. The *non*-conceivability of an invisible immaterial essence really means, that we are so accustomed to think under material images as to find it difficult to divest ourselves of such associations; yet as a fact we do think *self* as a non-material power. Moreover, the argument would apply equally to the force which Mr. Herbert Spencer affirms is not Matter. Also all physical research leads up to the unseen and the intangible. 2. The impossibility of the immaterial acting on what is totally diverse from itself is the old difficulty recognized by Leibnitz and Malebranche; and, as an argument, it applies equally to the non-material *force* which mechanical evolutionists are compelled to assume in order to account for molecular change. Further, if there *be* a non-material force, is it not conceivable enough that an immaterial nature—Mind—should be able to act on the *force* which is said to differentiate Matter? 3. The principle of philosophical unity does not render the essential distinction between Matter and Mind unreasonable; for if the principle is *a priori*, and therefore necessary and constant, it cannot be inherent, as such, in fleeting molecular combinations; and if it be the empirical result of observation on physical order, and therefore limited in its value, it cannot be made to govern facts so unlike one another as are consciousness and the flash of a lucifer match. Besides, the desired unity is not attainable in the *non*-mental world; for no one has proved that ether evolved out of atomic matter or the reverse. Moreover, if all forms of life did not evolve from one primitive molecule, but from many co-existing molecules, then the unity of evolution of life is the unity of parallels from a common base. If there be such a unity in relation to life, why not also a further and higher unity in parallel lines of matter, force, ether, and mind from an eternal original? 4. The testimony of physiology is admitted as to matters of fact. It is admitted that a modification of brain tissue accompanies every act of consciousness. But the argument really means this, that if there be a *non*-material reality called Mind, it would be sure to manifest its power in the physical sphere irrespective of the condition and apart from any change in the organism with which it is associated. There is no independent argument, as we have seen, against the existence of an immaterial power. Why then is it implied that it must not express itself through an organism? *Force* does. Why not *intelligence?* If it then express itself through an organism, is it not just as reasonable that its expression should be perfect or imperfect according as the organism is sound or unsound, as that the powers of a splendid pianist should be regulated in expression by the perfect or deficient keys of a piano? Conditions are not causes; and because Mind is affected by an organism, it is not irrational to suppose that, nevertheless, it is as much a reality as is the organism itself. It need not be a mere product of molecular change in the brain. 5. The argument from evolution will not hold good; for we have seen that, in so far as philosophical unity is involved in evolution, that is consistent with the essential distinction between Matter and Mind. Moreover, if we are to give heed to such men as Von Baer, Agassiz, Jeffreys, and Dawson, we are not to accept evolution, as regards animal life, as an established doctrine. Besides, there are many who with Darwin would accept evolution as regards animal life, but who cannot see proof that life and all else is evolved, by a long series of differentiations, out of the interaction of mere molecules under the mechanical pressure of force. Until the extreme view of evolution, from the original undifferentiated matter up to life, be established, it is impossible to argue that Mind is only the product of molecular change.

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* Met. ii. 2; Phys. v. 1; Met. xii. 6; Phys. viii. 5.

But not only cannot the adverse position be established for the foregoing reasons, but there are two positive reasons on the other side which cannot be set aside. 1. The *unique* character of consciousness. It has not the slightest affinity with any object, quality, or force with which science makes us acquainted. All other things in the world can be brought under common tests and modes of measurement. Hence their community of nature is inferred. This stands alone. It is the most common, persistent, well-known reality in the world, the most assertive, and yet it has never been found possible to express it in the slightest degree in terms applicable to anything else. Dr. Tyndall wisely calls it an "inscrutable mystery." 2. The radical distinction between Matter and Mind, if allowed, accounts for the most prominent phenomena of life, such as personal identity, permanence of will. All attempts to explain these phenomena on any other hypothesis issue in utter confusion and obscurity, and, therefore, on strictly scientific principles we are bound to accept the distinction alluded to as the most rational conclusion.

The bearings, on the order of society, of the doctrine that Mind and all covered by the term, is simply a name for the interaction of molecules, must occur to any one who contrasts that view with the other; *namely*, that it is an essence, an Intelligence, a Being amenable to laws other than mechanical.

COUNTRY FAIRS AND REVELS.

BY MR. FABYAN AMERY.

(Read December 12th, 1878.)

The last thirty years have witnessed a great development in the whole system of exchange of produce and manufactures in this country, which has necessitated and given rise to a correspondingly new and more expeditious mode of doing business than that by which our fathers used to buy and sell.

It is not to be wondered at that this revolution should have materially altered the whole economy of our "country fairs," by disintegrating their compound structure, leaving in one only the trade factor, and in another the pleasure; but in every instance robbing them of their peculiar character, the result of this combination of trade and pleasure.

But the last ten years has almost completed this work of transformation; for the measures rendered necessary to stamp out the "rinderpest" in 1866–7 closed nearly all the cattle fairs. Many have never since been restored, and all have been altered in character by the temporary break in the customs and usages of centuries. The present then is the time, before the last vestiges of the "Old English Country Fairs" disappear, to study their origin, development, history, and the influence they exerted on the habits and manners of the inhabitants of our rural districts.

For the origin of fairs we must go back into the mists of antiquity; and I believe we shall find the germs from which they have developed, in the remains of paganism allowed to become incorporated with Christianity by the early teachers of our faith. It seems certain that at special seasons of the year the Romanised British inhabitants of this country held feasts and rejoicings, in many cases similar to the greater Roman festivals. On the introduction of Christianity great difficulty was felt in weaning the converts from their idolatrous practices, and some indulgence was permitted. Fuller wittily observes :*

> "As careful mothers and nurses, on condition they can get their children to part with knives, are contented to let them play with rattles; so they permitted ignorant people still to retain some of their fond and foolish customs, that they might remove from them the most dangerous and destructive superstitions."

The Venerable Bede records † the special orders sent by Gregory to Augustine, as follows :

> "I have, upon mature deliberation on the affair of the English, determined that the temples of the idols in that nation ought not to be destroyed; but let the idols that are in them be destroyed. Let holy water be made and sprinkled in the said temples; let altars be erected, and relics placed. That seeing their temples are not destroyed, the people may the more familiarly resort to the places to which they have been accustomed. And because they have been used to slaughter many oxen in the sacrifices to devils, some solemnity must be exchanged for them on this account, as that on the day of the dedication, or the nativities of the holy martyrs, whose relics are there deposited. They may build themselves huts of the boughs of trees about those churches, which have been turned to that use from temples, and celebrate the solemnity with religious feasting, and no more offer beasts to the devil, but kill cattle to the praise of God in their eating, and return thanks to the giver of all things for their sustenance."

This license, direct from the Bishop of Rome, we may be sure was neglected neither by the mass of converts, nor by enterprising missionaries, who gauged their usefulness by the numbers of their converts, and became really a charter from the highest spiritual authority for a new form of religious festival—Christian only in name, but heathen and grossly sensual in practice, which still lingers among us in the country village revel. Every parish seems to have held its revel, wake, or dedication feast.

The Puritan Stubbs, writing in 1585, describes them thus :‡

> "Every town, parish, and village, some at one time of the year, some at another (but so that every one keeps his proper day assigned and appropriate to itself which they call their wake-day), useth to make great preparation and provision for good cheer, to which their friends and kinsfolks far and near are invited, insomuch as the poor men that bear the charges of these feasts keep the worse houses a long time after."

At first they were kept on the saint's day of the dedication of the church; but it being very inconvenient to have so many holidays on week-days, especially in harvest-time, they were by special permission of the church transferred to the following Sunday.

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* "Church History," p. 375, xvi. Century, book vii.

† Bede's "Ecclesiastical History," book i. c. 30.

‡ Stubbs' "Anatomie of Abuses."

Thus far religion and pleasure were the only elements in these festivals; but as great numbers of people attended, by degrees less devotion and reverence were observed, till at length, from hawkers and pedlars coming hither to sell their petty wares, the merchants came also, and set up stalls and booths in the churchyards; and not only those who lived in the parish to which the church belonged resorted thither, but others also from all the neighbouring villages. The greater the reputation of the saint, the greater were the numbers that flocked together on this occasion. The morning was spent in religious services; the remaining part of the day in all sorts of rural pastimes, such as dancing, wrestling, and cudgelling, which frequently gave rise to brawls. Thus on these occasions the churchyard of a quiet village and the tombs of the fathers of the parish were desecrated, not only by the horse-play above mentioned, but also by the greed of non-parishioners, who exposed their goods there in competition with the inhabitants of the place itself. This could not be permitted, and we find a statute * of Edward I. "commandeth and forbiddeth that from henceforth neither fairs or markets be kept in churchyards for the honour of the church."

The holding of these festivals, which had by the addition of the trade element now really become fairs, although as yet unrecognized as such, on Sundays, was justly objected to by the clergy; and an attempt was made by the Abbot of Ely, as early as King John's reign, to stop so flagrant a profanation of the Sabbath; but no actual enactment was made against them until the reign of Henry VI., when most of the principal towns had acknowledged fairs already established for the furtherance of legitimate trade, as well as for the pleasure of the inhabitants, and, we may also add, for the profit of the lords who held them.

Of course the festivals which remained undeveloped, being unable to form the union with the trade element, continued as before until the Reformation robbed them of their religious rites, and a few only have survived to the present day as pleasure revels, similar to those held at Ideford and Holne, of which we shall speak below.

This brings us to consider the privileges and usages of fairs

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* 13 Edward I., stat. 2., ch. 6, sec. 16. A.D. 1285.

proper. Henry Sumner Maine, in his lectures on *Village Communities*,[*] seems to hold that such communities originated in the associations of kinsmen, united by the assumption (doubtless very vaguely conceived) of a common lineage, as is found to be the case in India. The end for which they existed was for the tillage of the soil, but besides the cultivators many engaged in the humbler arts which provided the little community with articles of use and comfort. In early times the price of any article, whether the produce of the land or the industry of the township, was a fixed rate determined by custom in the long series of royal, parliamentary, and municipal attempts to fix prices by tariff. At this rate the inhabitants, and perhaps just their immediate neighbours, were accustomed to exchange their produce, and obtain such necessaries as their neighbours had to part with. The markets formed the place of such weekly sales, and the right to hold markets was a grant from the Parliament to lords of manors, and was at first only open to such. In course of time, as each township mastered and overcame the natural obstacles of the soil, thereby rendering the land more productive, and the appliances improved which assisted the artizan in his trade, more was produced than the inhabitants required. This surplus must be exported beyond the district, and the concourse of people assembled at the revel or festival of some popular saint offered an opportunity to meet on neutral ground with the consumer from a distance.

Thus it came about that every parishioner not only felt he had a certain right in all the produce of his parish, but could claim to purchase at the custom, or, as it is called, "times price," anything which a neighbour was disposed to sell, before it was offered to a stranger at a fair. I am not aware that this fact has been noticed or recorded elsewhere; but the idea still lingers in our rural districts that it is at least unneighbourly to offer in a fair anything that it is supposed or known a neighbour requires, although by doing so a higher price may be obtained. This idea is so vague and intangible that I have never heard it expressed in words, but only insinuated by stray remarks and gestures. Practically it is frequently acted on, as anyone resident in the country knows that cattle are generally offered to a neighbour who is thought likely to require them, a few days before a fair, where in all probability public competition would draw a higher price. This is always accepted as a mark of neighbourly friendship, and remembered as such, "For one good turn deserves another."

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[*] "Village Communities," Lecture vi., "Hist. Price and Rent."

Bishops and abbots of course did not overlook the reasonable source of profit to their shrines, to be derived from tolls levied upon the trade occasioned by themselves, and carried on within the bounds of their lawful jurisdiction. The influence of the Church very early obtained charters from the Crown to hold fairs and levy tolls on the dedication feasts of their churches and monasteries, or on popular saint's-days. For instance, in 1310, Stapleton,* then Bishop of Exeter, who held the manor of Ashburton, procured fairs of three days on the festivals of St. Lawrence and St. Martin, which were called the fairs of these saints, and are still held at Ashburton; as also St. Bartholomew Fair, at Smithfield, and St. George's Fair, at Modbury, are known by the names of the saints, and were concessions of no mean value. They usually lasted for a period of three days; namely, the eve of the feast, the feast-day, and the morrow, when farewells were to be said to friends and business transactions to be wound up. In certain cases, however, the time was nine days, as in the case of Modbury. I think it is a fact that charters for fairs were always granted by the Crown to the clergy or nobles of high rank, whereas those for markets were by the state to lords of the manor or municipal bodies.

The small size of the towns and villages in early times, and the infrequent resort of strangers to any place except upon occasions of religious festival, allowed few towns to become centres of trade; and hence the fairs of the most popular saints, to which men flocked from afar in greatest numbers, became the chief marts in every country. One great cause of their prosperity was, that the privileges granted by the Crown for the holding of fairs were equivalent to a concession of some channels for "free trade," through the labyrinth of taxes and restrictions. Besides being free from imperial taxation and the restrictions as to price above mentioned, traders were also protected from many of the ordinary risks of travel. The charter of Bartholomew Fair, granted by Henry I. in 1133, runs thus: †

> "I grant also my firm peace to all persons coming to and returning from 'the fair' which is wont to be celebrated at the Feast of St. Bartholomew; and I forbid any of the royal servants to implead any of their persons on

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* "Life of Stapleton," "Dev. Assoc.," vol. viii., 1876, p. 447.

† "Memoirs of Bartholomew Fair," by Henry Morley, p. 12.

those three days, to wit, the eve of the feast, the feast itself, and the day following, to levy dues upon those going thither."

The granting of the king's "firm peace" to all persons coming to, staying in, or returning from, a fair, was not a mere technical form, but as real as the protection rendered an ambassador.

By a statute [*] in the 3rd year of Edward I., it was enacted that traders were free from arrest on their way to or from a fair, or while in a fair, except for debts arising from transactions in the fair itself.

Fairs having become places of special privilege, in which for a time the laws of the realm were superseded by a code of charter usages, it became necessary to provide a special court, which should have jurisdiction at such times. This Court of Pie-powder seems to have always been a part and parcel of a fair. No fair in Europe has been known without such a court, and there is no record to be found of any ordinance by which the Court of Pie-powder was established in this country.[†] The court had jurisdiction only in commercial questions, and it tried them before a jury of traders formed on the spot, and was presided over by a person appointed by the lord of the fair. It could only entertain a case of slander relating to wares, not of person. It could hold pleas for amounts above forty shillings, and judgment could be deferred until the next fair; but it could sit only during fair time, could take cognizance only of things happening during fair time and within the fair, could try a thief who had committed robbery in the fair, only when he had also been captured within its bounds. The king himself, if he sat in the Court of Pie-powder, could not extend its powers; neither was it in the king's power to resume a charter that had once been granted, so that a fair once granted is good against the king. Such was the tribunal of commerce, known to fair-goers as the Court of "Pie-powder." Its name is corrupted from "pied-poudreux," dusty feet, because, says one antiquary,[‡] "justice is administered in it more quickly than dust can be shaken from the feet;" another, "because most fairs being in the summer the feet were dusty." But it is generally understood that "pied-puldreaux" was the old French name for pedlar, one who travelled from place to place selling his wares, without possessing house or land, whose part in the soil was no more than the dust upon his feet. Dr. Pettingall shows that in the "Scotch borough laws" a "dustifute" was "a stranger merchant travelling through the country, having no land or residence within the sherifdome, but going from place to place." It is therefore clear that the "Pye-powders' Court," for it was originally used in the plural number, meant the "Traders' Court."

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[*] 3 Edward I., c. 23. A.D. 1275.

[†] "Memoirs of Bartholomew Fair," p. 75–77.

[‡] "On Courts of Pypowder," by John Pettingall, D.D. "Archæologia," vol. i. pp. 190–203.

Although the powers of these courts were limited, we find a statute of 17 Edward IV. * sets forth that private wrong was done in their administration, as the commissioners or stewards appointed by the lords of the fairs to preside abused their power to their own advantage. It was represented that they tried cases which were beyond their jurisdiction, and by the connivance of unprincipled accomplices persecuted honest traders. This caused a great injury to fairs, as it diminished the number of merchants who attended, thereby injuring the lords of the fairs and the public who were accustomed to obtain their goods there; and goes on to set on the statute-book for the first time a formal recital of the nature of the courts and their privileges—ordaining that every plaintiff shall swear that the matter occurred in the same fair and during fair time; that the defendant may answer and plead that the matter was not within the jurisdiction and time of the fair, in which case, or if the plaintiff refused to swear, the case shall be dismissed out of the court, when the plaintiff must take his remedy at common law.

Fairs had now become settled institutions throughout the land, bound to the life of the people by the three ties of religion, trade, and pleasure, although the former began to loosen as the others extended. To add to the attractions of a fair, and to induce the rich and powerful to resort there with full purses in their pursuit of pleasure, amusements were introduced. It was only among the tents and booths of fairs, and not in the great cities, that the first entertainments were offered to the curious, so that at Frankfort, Leipsic, and Bartholomew Fairs there was entertainment good enough for royal visitors. As all the early fairs were of ecclesiastical origin, we can understand the amusements provided were cast in a religious mould. It is to the fairs that we must look for the birth and early development of the drama. It is said the first power of the mind revealed in a child is that of mimicry; nearly

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* 17 Edward IV., c. 2., 1477. "Constitution of Court of Pipowders."

all child's-play is dramatic; wherever therefore there have been men, there have been mimics, and some rude dramatic sport over affairs of life has been a favourite amusement. The Church seized on this element of human character, and taught Scripture history and Scripture mysteries; afterwards preached sermons on abstract morality in plays. Many years after our drama was matured relics of its old ways lingered in the places of its birth, and to Bartholomew Fair they clung so long that there perhaps took place the last performance of a "miracle play" in this country. In very early times the monks acted Scripture stories in their churches. Some written in Latin are extant; they were the dramas of the twelfth and thirteenth centuries, and entertained both prince and peasant. They came into England with the Normans, and passed from Latin into French for the amusement of the Court, then were performed in English for the entertainment and instruction of the people.

Legends of the saints were at first the chief subjects treated, and these formed the true "miracle plays." Dramatic stories taken out of Scripture were "mysteries," and later came the "moralities," which discussed moral truths upon the stage by the personification of virtue, and by examples out of history, wherewith the human interest in plays began, and out of which our modern drama so rapidly developed in the age of the revival of letters, and ripened into form and expression of that rare genius in which the England of Elizabeth was so rich. So it happened that before King Herod, Pilate, and the mediæval devil had been banished from fairs, Shakespeare had written, and Ben Jonson had turned Bartholomew Fair into a comedy. It was to represent the creation in a mystery play at fairs that the first "wild beast show" was collected; for one of the dramatic effects of this play, according to an old stage direction, was to represent the creation of beasts by sending among the excited crowd as great a variety of strange animals as could be brought together, and to create the birds by sending up a flight of pigeons.

We can well understand how the influence of fairs was increased, and the profit too, by the proper arrangement of these and other amusements, in an age when a dreary routine of work, almost amounting to slavery, held nearly the whole population bound in ignorance. The popular fair of the neighbourhood must have been the great holiday of the year to thousands of poor people, whose only relaxation was on such an occasion; and having transacted the little business which perhaps formed the excuse for the visit, seen the sights, joined in the sports, last, but not least, they purchased some "fairings," which consisted at first of small relics or rude images of the popular saint, but which in the course of time, or by the effect of the Reformation, degenerated into small figures in gilt gingerbread, to carry to the relatives at home in token that amid the bustle and excitement of the fair, with them at least, "out of sight was not out of mind."

The relation of the wonders and experiences of the fair must have formed an amusing and lasting theme for the long winter evenings, and have stimulated the young in their desire to attend also. Thus we find the great pleasure fairs of our county which have survived the general decay are those which, being held at the leisure time of agricultural labours, such as after the tilling in spring and after the harvest in autumn, have always been the holiday for country people. It was at the fair that the material was bought to make a boy's first suit of cloth clothes (an important event in the life of our ancestors), who jumped from petticoats to knee-breeches and tail-coats without passing through the intermediate stages of knickerbockers and jackets. I have heard a person describe being taken by his father to select the cloth at Modbury Fair, and how, after much hesitation, a brown from Somersetshire was chosen, and the pride with which in due course it was worn for the first time on Whitsunday.*

In Ben Jonson's time, the "sodden north countryman, who doth change cloth for ale at the fair here," was the only ancestor of the merchants of Leeds, Manchester, and Bradford at the cloth mart of St. Bartholomew Fair; for the woollen trade of the country was then in the hands of the West Country clothiers, who supplied all the fairs of England with cloth. This branch of the fair trade is now quite extinct; and the name of "Frome" Somersetshire painted over a cloth stall does not now exercise the minds of children to account for the ignorance of people in that country who spelt *from* "frome," as I have heard was once the case.

The horse fair also offered an open mart for the best horses reared in the country, and seems to have been largely attended by the "horse courser," who bought and sold horses already broken and in use; while the "horse dealer" traded in those of his own rearing and training. The importance of this part of the fair is gathered from the numerous statutes relating to the sale of horses at fairs.

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* I am informed that at Modbury cloth could only be procured at the fair. Travelling braziers repaired the pots and pans at the fair; and if the opportunity was neglected, the goodwives had to wait for twelve months before a small job could be executed.

The history of fairs, from their full development to the present day, can, I believe, best be traced in the statutes made from time to time to remedy abuses, which naturally crept in after a lapse of years, or were the result of mismanagement or avarice. The best evidence of the existence of a custom is a statute made to restrain or limit its continuance. For instance, lords kept their fairs open longer than the prescribed time, thereby injuring the legitimate markets, and perhaps robbing the collectors of customs. To provide against this abuse, a statute was passed, 2 Edward III., c. 15, which ordered—

> "That all lords which have fairs shall hold the same only for the time allowed; that is, for the time limited by the charters; and those who have them without charter for the time they ought to hold them of right. That every lord, at the beginning of the fair, do cry and publish how long the fair shall endure, to the intent that merchants shall not be at the same fair over the time so published upon pain to be grievously punished toward the king. Nor shall the said lords hold them over the due time upon pain to seise the fairs into the king's hands until they have made a fine for the offence, after it hath been duly found that the lords held the same fair longer than they ought, or that the merchants have sitten above the time so cried and published."

The merchants soon seem to have found a flaw in this statute, which was winked at by the lords of fairs; for we find that three years afterwards it was enacted, by 5th Edward III., c. 5,

> "That as in the former statute (2 Edward III, c. 15) there is no certain punishment ordained against the merchants if they sell after time, it is accorded that the merchants after the time shall close their booths or stalls, and if anything is sold after the time, the merchant shall forfeit to the King the double value of the article, and the informer receive one-fourth part."

Here, then, we have the order for the proclamation of every fair, which has continued in some cases to the present time, and may be heard at Modbury, Torrington, or Exeter; accompanied with the ceremonies peculiar to each place, which I shall mention below, as well as the custom of rearing a large "glove" on a pole at some conspicuous place, there to remain the whole legal time of the fair, as a token to all that "free trade" was the law of the place.

It has been seen how trade throve under the walls of churches on Sundays and on the principal saints' and holy days, with its fetters loosened, and defended from taxation by the Sovereign. The time soon came when the religious element of fairs was to be lost, and they were to remain as places of trade and pleasure only.

This most probably was the case before it was publicly recognized; and it was not until the increase of trade rendered the Sabbath or holy day of the fair, the busiest working day of the whole year, that the following statute was passed by the influence of the clergy in 1448, being 27th Henry VI., c. 5.

> "Considering the abominable injuries and offences done to Almighty God and to His saints, always aiders and singular assisters in our necessities, because of fairs and markets upon their high and principal feasts, as in the feasts of the Ascension of our Lord, in the day of Corpus Christi, in the day of Whitsunday, in Trinity Sunday, with other Sundays; and also in the high feasts of the Assumption of our blessed Lady, the day of All Saints, and on Good Friday, accustomably and miserably holden and used in the realm of England, in which principal and festive days, for great earthly covetise, the people is more willingly vexed, and in bodily labour foiled, than in other 'Ferial days,' holiday or resting days, as in fastening and making their booths and stalls, bearing, carrying, lifting and placing their wares outwards and homeward, as though they did nothing remember the horrible defiling of their souls in the buying and selling, with many deceitful lies and false perjury, with drunkenness and strives, and so withdrawing themselves and their servants from divine service. It was ordained that all manner of fairs and markets on the said principal feasts, and Sundays, and Good Fridays, shall clearly cease from shewing of all goods or merchandises (necessary victuals only except) upon pain of forfeiture of all the goods, the four Sundays in harvest except. Nevertheless it is permitted to hold fairs, which have no time to hold their fair but only upon the festive days aforesaid, to hold by the same authority of the old grant within three days next before the said feasts or next after, proclamation first made to the simple common people upon which day the fair shall be holden. Those fairs which of old times had special grants for sufficient days before or after the feasts aforesaid, shall in like manner hold their fairs the full number of their days, the said festive days and Sundays and Good Fridays except."

In 1486 we find recorded a statute* evidently framed to counteract the endeavours of the Corporation of London to force the trade of the land through the narrow channels of the city Guilds in direct opposition to the spirit of the free trade principles of fairs:

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* 3 Henry VII., c. 9.

> "On the petition of the citizens and freemen of the city of London against an ordnance enacted by the Mayor and Aldermen which prohibited them from attending any fair or market out of the city to sell any wares or merchandise, in order that the buyers should resort to London to the utter destruction of all the fairs, when persons of all degrees buy many things that be good and profitable, as ornaments of holy church, chalice, books, vestments; also for the household as victuals for time of Lent, and other stuff as linen cloth, woollen cloth, brass, pewter, bedding, osmonde, iron, flax, and wax, and many other necessary things. Whereupon it was enacted that 'all freemen and citizens of London' might hereafter sell their wares in any fair or market in the realm they pleased, and the said ordnance and act made in the city to be void and of none effect."

The vexed question of receivers of stolen goods, especially of pewter, lead, and brass, came up in 1503, when the statute 19 Henry VII., c. 6, enacted

> "To prevent itinerant buyers and sellers of pewter and brass wandering about the country and receiving stolen goods, It was ordered that no pewter or brass goods should be sold or exchanged except in open fairs or markets, or in the house of the pewterer or brazier."

Then it was found that cattle jobbers, by buying privately and selling in fairs, cheated the farmer of his profit. To meet this, it was enacted by 3 and 4 Edward VI., c. 19 (1549)—

> "That persons should not buy cattle except in open fairs or markets, save for their own use, unless butchers, and should not buy and sell again in the same fair."

In 1554, by 1 and 2 Philip and Mary, c. 7, it was ordered that country people should sell goods by retail only at fairs or markets in any city, borough, or town.

The question of the too easy disposal of stolen horses at fairs received attention in 1555. The 2 and 3 Philip and Mary, c. 7, sets forth—

> "Forasmuch as stolen horses were sold or exchanged in private places and stables of fairs and markets, and the toll privately paid, whereby the true owner was unable to obtain redress by the common law of this realm, it was enacted that the owner of every fair should appoint a special open place where horses shall be sold, and also a toll-taker, who shall be present from ten o'clock to sunset each day of the fair, at which time and place toll for horses should only be taken. That the particulars of every bargain should be written in a book provided for the purpose, with the names and residences of the parties to the bargain, and a description of the horse. That a stolen

> horse could not be removed from the buyer if it had been openly exhibited for one hour; but if these regulations were not complied with, the owner might seize the horse whoever had it."

By 31 Elizabeth, c. 12, sellers of horses must be known to the toll-keeper, or someone who would vouch for the sale, whose name, with the price of the horse, must be entered in the book, and a certificate of the same given to the buyer.

The laws relating to the entertainment of strangers, which in early days were very strict, relaxed, however at fair-time.

There is a painful reminder of the mutual distrust of man and man in the edict of Henry II.—

> "That no stranger should be lodged for more than one night by any man who would not be made answerable on his behalf, unless upon reasonable excuse, which was to be shown by the host to his neighbours; and when such a guest departed, it was to be in the presence of the neighbours, and at day-time."

On the first night a stranger lodged in a house he was accounted "unknown;" on the second, "a guest;" and on the third, "a member of the household."

In the borough of Totnes is mentioned in the corporation records, 30th Henry VI., 1452, as follows:

> "Item, that the mayor shall make proclamation that no one shall harbour wanders through the town, being beggars, within his house more than a day and a night under penalty of being presented as receiver of mendicants."

Before the age of inns, or rather hostelries, it was at religious houses that travellers of all sorts rested; and doubtless during the days of a neighbouring fair such houses were full of guests. But, bearing in mind the numbers of all sorts of persons who frequented fairs, and the season of the year when pleasure fairs were held, we may assume that many slept by night among the booths; and that in the connection of some fairs with certain forms of cooked meat, we have the continuance of a custom that arose out of necessity when the fair was established, as for instance, South Brent and Tavistock "Goose Fairs" in September; Buckfastleigh "Lamb-pie Fair" at Midsummer, and "Pear-pie Fair" in September; Totnes "Gooseberry-tart Fair" in May. Possibly the Buckfastleigh Lamb-pie at Midsummer may be of earlier origin, as the lamb is always associated with John the Baptist.

For the convenience of fair-goers, the statute 3 Charles I., c. 3, 1627, which enforces a penalty for selling liquor in unlicensed houses, exempts those who sell ale or beer at fairs during the proper time of the fair, in manner and sort as has been done in times past for the relief of the king's subjects who repair there.

A bush of evergreen hanging, or a green bough standing, before a door was the sign that liquor was sold within. I do not know how recently this exemption from the licensing act in the case of fairs has been repealed; but within the last fifty years it was customary at Modbury. A holly bush hung from a private house served for an excise license during St. George's Fair; hence the old saying, "Good wine needs no bush."

The last vestige of a religious gathering forsook the fair at the Reformation, when even, according to Ben Jonson,* a basket of gingerbread fairing was denounced as "a basket of popery, a nest of images, and whole legend of ginger-work."

The Reformed Church took no tribute from them, and paid no more heed than to other assemblages of men in pursuit of gain or pleasure. The holy houses also, which gave birth to and nurtured the institution, passed into lay hands with the tolls. But fairs still lived, and continued to fulfil the need of such a gathering-place for traders as the cloth fair and horse fair offered; moreover, the centres of special trades became connected with the speciality of the place, as the Bristol Wool Fair, the Cheddar Cheese Fair, Exeter Leather Fair, &c. As cattle markets alone have they been able to keep their place in connection with trade; but as such they were too wide apart to meet the requirements of the farmer. Great markets have therefore sprung up to supplement the fairs in our country towns, and with such assistance they may linger a few years still; but rather as cattle markets than fairs.

For centuries fairs represented the true need of amusement for the people, and were attended by the families of the county gentry, and the merchants of our country towns, who patronized the theatres, booths, and shows. But as knowledge advanced and refinement spread, better enjoyments than they could offer drew away, beginning from above, class after class, till such pleasure as it was their nature to afford remained an amusement only to the lowest. Thus many fairs have quite died out (as for instance that at Plymouth) which had long ceased to be places for worship or marts for trade; so also they were outgrown by the people as haunts of pleasure.

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* *Vide* the Rabbi in Ben Jonson's comedy of "Bartholomew Fair."

Perhaps no fair exercised more influence on the inhabitants of a district than that held at Denbury, near Ashburton, on the 19th September. It was held at the "Church Town," and was attended by all the country round. Carriages might be seen there bearing the arms of the Carews of Haccombe, and other county families. It was the great business and pleasure fair of the district; and became the fixed date for payments of rents; gathering hazel-nuts, which are supposed to become slip-shell on that day; and all the sayings and doings of the season.

The cattle portion of this fair was stopped in 1866, on account of the rinderpest, when this old and influential institution came to a sudden end, the attractions it offered to pleasure-seekers being unable to sustain it. I believe a few interested persons have attempted to revive it within the last year or two, but they have succeeded only in name. The curious part* connected with this fair is, that in Labrador there is still a "Denbury Fair," held on the same day, and looked forward to just as eagerly as the old Devon fair was in bygone years. No one in Labrador now knows, however, whether Denbury is the name of man, woman, place, or thing. The fair was established generations ago by settlers from Devonshire, whose descendants, although they still keep up the merry-making after the fashion of their forefathers, have quite forgotten its origin.

Having thus far traced the origin, development, and history of country revels and fairs, let us see what relics of their palmy days still linger among us. Of ancient revels which never developed into fairs, owing doubtless to the absence of the trade element, we may mention those of Ideford and Holne, which are still held, although perhaps most of their ancient glory has departed.

Ideford is a small village at the foot of the Haldon hills; its church is dedicated to St. Mary. Here for three days, about the 10th of September, the whole place is given up to pleasure. The 8th of September, the Nativity of the Blessed Virgin, the patroness of the church, without doubt fixed the date of the revel.

The houses of the farmers are filled with friends from a distance, and shows, stalls, and booths are set up in every open space in the village. The first day is spent in hare-hunting on Haldon, and every horse that can be procured is mounted by the inhabitants or their visitors, by many for the first time. The open hillsides allow the sport to be witnessed by all. The hunt over, large parties of friends are entertained at dinner in the various houses; and in the evening still larger parties meet, and pass the time with dancing and music. The second day is spent in coursing in the more enclosed lands, and the evening is again given over to parties and social gatherings. The third day is mostly taken advantage of by those who have friends from a distance, for excursions to show their visitors the neighbourhood, generally to Teignmouth, Dawlish, or Chudleigh. The shows, fairing stalls, merry-go-rounds, and other attractions, have all the time been fully patronized, and doubtless the "publics" are not neglected.

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* *Vide* article on "Folk-lore," in "Standard" newspaper, 17th August, 1876. By R. J. King.

At Holne an ancient revel is kept up on "Old Midsummer" day, when a ram is roasted whole in a field behind the church called Play Park, by virtue of ancient usage. Tradition says the inhabitants have a right to take the first they find on entering the Moor for this purpose, but now I believe it is subscribed for. This ram-roasting on Midsummer or St. John Baptist's day is doubtless a relic of paganism, being a modern form of the old Beltan fires and feast, formerly held at the summer solstice, and continued almost unaltered in honour to the saint who "bore witness to the light," and was described by our Saviour as "a burning and shining light." When properly roasted the ram is carried in procession, preceded by a fiddler, to the inn, and cut up by an experienced person and distributed among the people, the poor not being forgotten. Old people who have made it a point to get a slice every year, assure me "that a slice of revel ram beats every other sort of roast meat in flavour and richness; for," say they, "'tis so 'sweet.'" The feast over, wrestling and sports commence, then the fiddlers appear, and dancing is kept up to a late hour.

"The glove" is still hoisted during the fairs at Exeter, Torrington, Barnstaple, Totnes, Modbury, and I have no doubt many other places. This is the remains of the idea of the free-trade element of ancient fairs, as well as a public sign of their duration.

In how many towns the original charters are preserved it is impossible to say. A collection of them would be of historical value to the county. As a specimen of them, I will quote that for Totnes Fair, granted, or rather confirmed, by Queen Elizabeth at Greenwich, on 31st August, 1596, being the thirtieth year of her reign:

> "We have also granted, and do for us, our heirs and successors, grant to the aforesaid mayor and burgesses of the borough aforesaid, and their successors for ever, that they and their successors have to keep in the borough aforesaid yearly for ever, one fair, to last three days; viz., the eve, the day, and the day following the feast of St. Simon and St. Jude the apostles, together with the Court of Pye-powder, to be held during the same time before the steward thereof, to be appointed by the mayor aforesaid for the time being, together with all liberties and free customs to such a court belonging, together with the tolls, stallage, picage, fines, and amercements, and all other profits, commodities, and emoluments whatsoever, of such fairs or Courts of Pye-powder, happening, growing, or chancing; and with all liberties and free-customs to such fairs and Courts of Pye-powder belonging or appertaining, so as that fair be not to the hurt of other fairs near adjoining." *

The proclamations ordered by the statute 2 Edward III. are still made at some of our fairs, although the actual ceremony varies in different places. As examples of such proclamations I will quote two; viz., at Modbury and Great Torrington.

At Modbury, on the 4th May, being the eve of Old St. George's-day, † even though it falls on a Sunday, the portreeve and borough jury assemble in the centre of the town, once the market cross. Here the crier, having made three "Oyez," and required all persons to keep silence, makes the following proclamation:

> "The fair called St. George's Fair, within this borough of Modbury, is now held in the right of (Mrs. Mary Crespin) lady of the said borough, in whose name and behalf, and according to the statute of second year of King Edward III., cap. 15, we do proclaim and publish the same, and that it is to continue for nine days from hence, being St. George's-eve (Sunday excepted by 27 Henry VI. c. 7), during which time it is the duty of all persons who shall come to this fair (especially the officers and inhabitants of this borough) to use their utmost endeavour to preserve the Queen Majesty's peace within this borough, and to cause every one that shall disturb it to be punished for so doing; and if any matter shall happen to arise relating to any bargain within the jurisdiction, or time of this fair, it is determinable by a Pye-powder Court, wherein the steward of this borough will be ready to perform his part.
>
> "By the statute of second and third of King Philip and Queen Mary,

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* *Vide* COTTON'S "Totnes," Appendix, pp. 97, 98.

† St. George's-day is 24th April. An old memorandum-book in Mr. Dobell's possession shows that after the change of the calendar, in 1752, the fair at Modbury was held for a few times on that date, when, by general consent, it was changed to the 4th May, being Old St. George's-day. [Query: Was this change owing to a superstitious idea that the calendar ought not to be changed? or that there was a chance of losing the charter if the fair was not kept on the identical day?]

every owner of a fair or his deputy is to appoint a toll-taker or book-keeper to sit there from ten of the clock in the forenoon until sun-setting, on pain of forty shillings; and therefore I do, on behalf of the lady of this fair, appoint A. B. to be the said toll-taker. All persons are to take notice, and are required to pay toll for all horses, cattle, and other quick goods that shall be sold or exchanged within this fair, and also coverage and stallage according to the custom of this borough, and no person ought to take more on pain of being punished for so doing.

"By the statute of 31st Queen Elizabeth, every seller or exchanger of a horse, nag, or mare, in a fair (who is unknown to the toll-taker) is to procure a creditable person known to him to vouch the sale or exchange thereof, under pain of £5, and every false voucher forfeits the like sum. The names of the buyer and seller or exchanger, their abode, and additions, and the colour and one mark at least of the horse, mare, or nag sold or exchaned, ought to be entered on the toll-book to warrant the sale, in case the same shall appear to be stolen. All which is now published as well, on behalf of the lady of this borough, as for the quiet and safety of all persons who are, or shall be concerned, in this fair, and we hope that due regard will be paid thereto. God save the Queen."

After the proclamation the party adjourn to an inn, where a bread and cheese supper is provided, and washed down with beer or cider, after which "Success to the Fair" is drunk in a glass of grog. The whole is paid for by a small fee levied on the lord of the borough, the steward, and the officers. The tolls of the fair are now the perquisite of the portreeve for the time being, and are usually spent in a dinner which he gives. The glove is raised on the market-bell case.

At Great Torrington the proclamation is read by the Town Clerk in the presence of the Mayor and mace-bearers, from a window of the town-hall, and the glove is raised on a pole in the cattle market. There are three fairs—Michaelmas, Midsummer, and St. George's—all held on the old style. The proclamation runs:

"BOROUGH OF GREAT TORRINGTON FAIR PROCLAMATION.—The Right Worshipful the Mayor of this town doth give you all notice that there is a free fair to be kept, this eve and two following days [or in case of St. George's, this day and two following days], within this town and borough of Great Torrington, during the time of which Mr. Mayor of this town in the Queen's name doth strictly charge and command all and every person and persons whatsoever to observe and keep the peace of the kingdom, and especially here, during the fair.

"And that all buyers and sellers do use true balances, weights, and measures, and truly do pay their toll, custom, coverage, and other duties as they ought to do.

"And that no cloth buyer presume to buy any raw cloth before he hath received a meet-yard 'furred' and sealed at the tollswell of this fair as he ought, and as hath been accustomed for measuring of the same. And that all yarn buyers do bring their yarn to the beam ordained within this fair for the weighing thereof, and to no other, and truly do pay duties for the same as they ought to do, on pain of the cloth and yarn otherwise used, and to make fine for their disobedience. And that all manner of victuallers bringing any kind of victuals to this fair to be sold do see that the same be good, lawful, and wholesome for man's body; and do sell the same at reasonable prices, on pain of forfeiture of the same victuals, and further punishment for their transgressions. And that all manner of persons use and behave themselves quietly and orderly according to the laws, on pain that shall fall thereon. And that no person do forestall, regrate, or ingross any victual, or any other commodity or thing being in this fair to be sold, on pain of forfeiture of the double value thereof, besides other punishments for their offences. And that no stranger be out of his lodging or wandering abroad in the streets after nine of the clock at night, on pain of imprisonment and fine for his offences. And that none but such as are officers of this fair to bear any armour or weapon within this fair in disturbance of the peace of this fair or the kingdom. Nor make any assault or affray, riot, rout, or unlawful assembly within this fair, on pain of forfeiture of the same weapon, and to receive such other punishment as is meet for such offenders. If any injury or wrong be committed or done to any person within this town during the fair, the same being approved before the stewards of this fair, to whom the charge and government of the same fair is committed, upon complaint unto them thereof made, it shall be according to justice, by God's grace and assistance. God save the Queen."

At Barnstaple the Mayor meets the Town Council, and as many others as choose to be present, in the town-hall, where he treats the company to "toast and ale;" after which a procession parades through some of the streets, and at certain points the Town Clerk reads the proclamation, and the glove is hoisted.

At Exeter until recently the Mayor, Town Clerk, and other officers paraded the streets, preceded by drums and fifes. After the proclamation the glove was raised over the guildhall. The fair is still proclaimed, and the glove raised.

Of the Pye-powder Court there seems to be no trace remaining, as far as I have been able to ascertain. A gentleman of Bristol informs me that there it has been held within his recollection, but it has since merged into the "Tolzey Court" held by the Recorder, in which court judgment can be obtained within forty-eight hours.

Such are a few samples of the still existing relics of the great popular institution, which for so many centuries influenced at first the religion, and afterwards the trade and pleasure of our ancestors. These relics are fast dissolving; soon the generation of fair and revel-goers will disappear also, and with it a rich mine of folk-lore, traditions, and customs will be for ever lost.

DIGESTION.

ABSTRACT OF PAPER BY MR. W. SQUARE, F.R.C.S.

(Read December 19th, 1878.)

THE subject of digestion was treated under the following heads: Mastication; deglutition, a complicated act; digestion in the stomach; the gastric juice; the digestion in the small intestine; its various organs; Brunner's glands; villi; Liebevkuhn's follicles; Peyer's patches; the bile and pancreatic secretion; digestion in the large intestine.

LOCAL LITERATURE PAST AND PRESENT.

SYLLABUS OF PAPER BY MR. W. H. K. WRIGHT, F.R.H.S.

(Read January 16th, 1879.)

GENERAL remarks. Introductory. National Literature and Libraries. Local literature; advantages of special collections in local libraries. Early writers; theological writers; artist-authors; scientific writers; poets and writers of fiction. Biographical and historical works. Publications on the manufactures, trade, and commerce of the district. Periodical publications; magazines, newspapers, &c. Guide-book literature. General and topographical works. Literary curiosities. Local literary institutions; their origin, growth, and present positions. Claims for a Devon and Cornwall representative library. Conclusion.

LIGHTING BY ELECTRICITY.

ABSTRACT OF PAPER BY MR. C. OXLAND.

(Read January 23rd, 1879.)

THE object of this paper was to trace the development of the different means of producing currents of electricity, adapted to lighting purposes, from the batteries of Grove, Bunsen, and others, to the dynamo-electric machines now in use. The forms of magneto and dynamo-electric machines most in use, and the principles upon which they acted, were described; and also the Jablochkoff, Rapieff, Werdermann, Siemens, and Wallace-Farmer lamps. The cost of production was given in trials made in London, Paris, and Washington, United States, which cost was shown to have been much diminished by the experience and improvements gained by these trials. In conclusion the question of subdivision of currents was described.

JULIUS CÆSAR.

ABSTRACT OF PAPER BY DR. NEILD.

(Read January 30th, 1879.)

THE lecturer having introduced the subject, by maintaining that Shakspeare from his knowledge of human nature was able to build up real and perfect characters from the *disjecta membra* of history, proceeded to point out that Shakspeare was entirely indebted to Plutarch for the facts and incidents of "Julius Cæsar;" much, too, of the dialogue being a poetical paraphrase of Plutarch's narrative. The fidelity with which Shakspeare followed Plutarch was dwelt upon, and extracts from that historian were given to illustrate the groundwork upon which the dramatist built the chief characters of the play. The play itself was then considered, not so much as a whole as with the purpose of ascertaining the leading characteristics of the chief persons represented.

Brutus was the hero of the play, and his character as depicted by Shakspeare was mainly dwelt upon; his friendship for Cæsar, so far from being a blot on his fame, considering the part he took against him, was shown to have been an additional reason for admiration, whether we view him as a conception or as a real character—his unfeigned love for Cæsar making what he conceived to be his duty tenfold more painful. His tenderness to his wife and consideration for his sleepy page were illustrated by extracts.

Julius Cæsar was not a prominent character. Cassius was referred to as a picture of a political conspirator in striking contrast to Brutus. Mark Antony was a clever, dissolute, and unscrupulous man, whose almost only virtue was his fidelity to Cæsar. Some of the minor characters were considered, and the lecturer concluded by quoting Mark Antony's generous epitaph over Brutus.

THE SLAVONIANS OUTSIDE THE RUSSIAN EMPIRE.

SYLLABUS OF PAPER BY REV. W. S. LACH-SZYRMA, M.A., F.R.H.S.

(Read February 6th, 1879.)

The Slavonic race generally. The Russian Empire. Thoughts on first sight of the Russian frontier. Enumeration of the Slavonic races outside the Russian frontier. The Wends and Wendischland. The Servians on the Elbe and the Danube. Characteristics of the Slavonians, physical and mental. The *Mir* foundation of ancient Slavonic society; community. Aspect of the country in Posen. The Hradschin, or Kremlin. Ancient cities; Posen, Cracow, Gniez-i-Prag. Oriental character of the Slavonians. Influences of Asia on Slavonic lands. Present tendencies of civilization. Modern Slavonic literature and art. Tendencies of the present day. The probable future of the race. Conclusion.

SHAKSPEARE'S CORIOLANUS.

SYLLABUS OF PAPER BY MR. LEWIS LEWIS, M.R.C.S.

(Read February 13th, 1879.)

THE lecturer spoke of the drama generally, passing thence to Shakspeare's interest in Roman history; the authorship of Shakspeare's plays; the contemporary opinion of their value, and the later opinions. He dealt with the importance of history and tragedy, and indicated the salient features of Shakspeare's history-tragedies, tracing the sources of his information. The details of Coriolanus were then passed in review, with criticisms and emendations.

THE BONE CAVES OF THE PLYMOUTH DISTRICT.

BY MR. R. N. WORTH, F.G.S., HON. MEM.

(Read February 29th, 1879.)

I HAVE to invite attention to the bone-bearing caverns of the limestone of Plymouth. Cave-hunting is a purely modern branch of science. For hundreds of years the bones of extinct animals have been found at frequent intervals in cavern and allied deposits; but it is only in our own time that they have been really understood. Nearly all the stories of buried giants can be traced to the discovery of the bones of a mammoth, or of one of its huge allies. And even when comparative anatomy began to be developed, the lesson these remains had to teach remained unread. Elephant bones found in England were assigned to animals brought over in the army of Julius Cæsar. Relics of the rhinoceros, tiger, bear, and hyæna, were traced to the losses sustained by travelling menageries. And when their quantity utterly disposed of such random hypotheses, it was suggested that the animals were borne hither on the wave of the deluge. Anything seemed preferable to the simple truth—that herds of elephants once roamed the wastes of Britain; that the hippopotamus dwelt in its rivers; that the rhinoceros lurked in its swamps; that its woods and jungles were peopled by the lion and hyæna, and by that still more terrible beast, *Machairodus latidens*, the great sabre-toothed tiger; that bears haunted its mountains; that its plains were covered with droves of gigantic cattle, the urus and the aurochs, with the stately Irish elk; that even the reindeer found fitting quarters; and that in the midst of this strange wealth of animal life man maintained a precarious existence, notwithstanding the seemingly unequal conflict forced upon him by his dangers and his needs.

That such were the denizens of our land down to a time when it received the main outlines of its present contour, we have learnt from the cavern researches of the present century, commencing in

Devon, here at Oreston, and illustrated most cogently by the revelations of Kent's Hole and Brixham. But we have lost much. Long before they attracted scientific notice, and in too many cases since, the contents of bone caverns met with no better fate than that of being turned to road-mending, thrown into limekilns, or sold at so much per pound to the marine store dealer.

Because our district holds such an important relation to this branch of science, and because the latest bone cavern of the locality came under my own investigation, I have been led to direct attention to this subject. Nearly all that had been written about the Oreston caves up to 1872, was published by Mr. Pengelly, F.R.S., F.G.S., in the *Transactions of the Devonshire Association* for that year;* but the Oreston, though the principal, are not the only ossiferous deposits of the Plymouth limestone; and it is my present aim to present a complete consecutive history of all the bone caves of Plymouth, including therein my own observations.

The Plymouth limestone forms a band averaging above half a mile in width, and extending six miles from the Dockyard on the west to West Sherford on the east. It has an average height of one hundred feet above mean sea level; and its beds have a general southerly dip. A more constant feature than its bedding is the regularity of its divisional planes, those approximately perpendicular joints or divisions which cut the rock at right angles to the bedding in two great series, in a northerly and southerly, and easterly and westerly direction, and may be seen traversing the face of the quarries from top to bottom. These planes are the result of causes subsequent to the formation of the rock, which, with the aid of the bedding, they break into rhomboidal masses, suggesting a rude kind of crystallization. In these joints the caverns originate. Water charged with carbonic acid exercises a chemically solvent power over limestone. Finding its way into the joints from the surface, it eats away by slow degrees the rock-faces exposed to its action. Hence the caves. Give the water time, and it will work wonders. When the water is overcharged with lime redeposition is set up, and stalactite and stalagmite result. Where the underground current is most persistent and extensive there most work will be done. The caverns commonly run with the joints and across the bedding. At one point of Cattedown, and again immediately opposite at Oreston, there is a continuous line of cavities midway in the face of the cliff. These reveal the existence in former days of a considerable subterranean waterflow; and, as a natural drainage level, show that during their formation there was little change in the relative positions of land and sea—marking the point where the waters percolated to their outlet in the open channel. A distinction has been drawn between fissure and tunnel caverns, convenient for descriptive purposes, but non-essential. A tunnel cavern eroded until the roof gives way becomes a fissure cavern; while should the fissure be closed by breccia cemented by stalagmite, the tunnel phenomena would be reproduced. Every cavern—fissure and tunnel—must during its formation have possessed some surface communication, though the opening may have been subsequently closed.

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* Vol. v. part i., pp. 249–316.

Interest in cave-hunting began to be shown early in the present century. When Mr. Whidbey was appointed superintendent of the Breakwater Quarries, in 1812, he was requested by Sir Joseph Banks to examine any caverns he might meet with, and have any bones or other fossil contents carefully preserved.* We are not told what was the originating cause of this request; but so far back as 1786, at Kirkby, in Yorkshire, bones† had been discovered in limestone fissures, and used for road-mending. Possibly the loss of this opportunity prompted the action taken with regard to Oreston. Nor was the attention given without result. In 1816 an ossiferous fissure was discovered at Oreston; and this was the first bone cave in England which was made the object of scientific enquiry.

In November of that year a number of bones of the rhinoceros, portions of the skeletons of three distinct animals, in a perfect state of preservation, were found embedded in clay in a cavern near the base of the cliff. The cavern was 160 feet in the hill from the original edge of the cliff, and was reached after blasting away 60 feet of the rock horizontally (100 feet having been previously removed). The face of the rock was 74 feet perpendicular above high-water mark. The bones were found at a depth from the surface of 70 feet, and 3 feet above the bottom of the cavern, which was wholly filled with clay. It was the opinion of Mr. Whidbey and of the workmen that the cavern was entirely enclosed in the solid rock. Many caverns had previously been met with, but this was the first which had contained bones. It was 15 feet wide, 45 feet long, taking the direction into the cliff, and 12 feet deep. The bones were 6 molars, and parts of 2 vertebræ, 1 radius, 1 scapula, 2 ulnæ, 3 humeri, 3 femurs, 2 phalanges, 1 carpus, and 1 metacarpus.*

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* Sir Everard Home, "Phil. Trans.," 1817, part i. pp. 176–182. Cited "Devon. Assoc. Trans." vol. v. part i. p. 249. As Mr. Pengelly's valuable *resumè* of the Oreston cave literature is generally available, while the original authorities are not, I give in each case the double reference.

† They were human. Vide Col. Hamilton Smith's "Nat. Hist. Human Species," pp. 94, 453.

Four years later another bone cave was discovered, and the contents forwarded by Mr. Whidbey, as in the former instance, to the Royal Society. These bones Mr. Whidbey, writing on the 11th November, 1820, to Sir Everard Home,† stated had then been "lately found in a cavern 1 foot high, 18 feet wide, and 20 feet long, lying on a thin bed of dry clay at the bottom." Sir Everard described them as consisting of one molar of rhinoceros—single-horned; teeth and bones of the black or brown bear,‡ two portions of bone of an animal of the deer kind, and portions of bone of some animal the size of a bear. The cervine remains were found in a cavity near to but distinct from that containing the remainder. This cavern also Mr. Whidbey described as entirely surrounded by compact rock. It was about 8 feet above high-water mark, 55 below the surface, and 174 yards from the original face of the cliff, the quarries having been worked inwards about 120 yards in that direction from the cavern of 1816.

So far the quantity of bones discovered had been small, though their importance was great. The next find was of much larger magnitude. Continuing to work into the hill, at a distance of 201 yards from the commencement of the quarry, and 180 yards in a western direction from the cave of 1816, the first of five other caves or chambers was discovered, communicating by passages and associated with galleries. The top of the cliff here was 93 feet above high-water springs; and while the bottom of the lower cave was about 30 feet above high-water, the roof of the uppermost of the series was only 17 feet below the surface.* Of the five chambers the lowest was the largest, and here the bulk of the bones were found. They were "mostly covered with dirt. . . . Part of the bones were lying on the dirt, and in crevices about the caves."† Many of the bones were found in an inner recess. This discovery was made about the middle of 1822. On the 19th August in that year Mr. Whidbey forwarded his find as before to the Royal Society, and the bones were reported on by Mr. Clift, Conservator of the Museum of the Royal College of Surgeons, wherein they were deposited. This collection was not only much larger, but wholly different in character to the preceding. The bones were those of ox, deer, horse, hyæna, wolf, and fox, and they occurred in this curiously separated form: though the cavities communicated "the bones of the different graminivorous animals were found mingled together in the same cavity; but those of the carnivora at a considerable distance from each other; the bones of the hyæna having been discovered in the [second or inner of the two lower] cavern . . . . and those of the wolf and fox in the gallery" [a passage described by Mr. Whidbey as leading from the outer cave to the surface of the quarry.]‡

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* Sir E. Home, *op. cit.* Cited "Devon. Assoc. Trans.," vol. v. part i. p. 250.

† "Phil. Trans.," 1821, part i. pp. 133–5. Cited "Devon. Assoc. Trans., vol. v. part i. pp. 251–2.

‡ Professor Owen afterwards identified the ursine remains as those of both Ursus spelæus and priscus. *Vide* "Brit. Foss. Mam.," pp. 84–5.

There are two other points to be noted in regard to this collection. A portion of the radius of a young wolf had "the impression of the incisors and canine teeth of some small animal of the size of a weasel." This was the only bone that bore any appearance of having been gnawed or otherwise mutilated.§ Two of the bovine bones unequivocally showed "the effects of ossific inflammation on their surface," and in the lower jaw of a young wolf "an abscess on each side had produced sinuses, and a considerable alteration in its form and texture.‖

The bovine bones included three horn cores of different individuals, and belonged to more than a dozen animals, varying considerably in their age, and of different species. Of smaller ruminants there were imperfect remains apparently of a deer, and others belonging to very young animals, probably of a calf or fawn. Of the horse there were bones and teeth of twelve or more individuals, as if from more than one species, and some from the worn state of the teeth very aged. Five or six individual hyænas of various ages were represented, with a portion of a skull and lower jaw twice as large as that of a full-grown hyæna of the present day. Of the wolf there were the bones of five individuals; of the fox only a few vertebræ and two canines of the lower jaw. Some of these bones were sent up as late as November 9th by Mr. Whidbey, who then stated that they would probably be the last.*

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* J. Claringbull, "Guide to the Breakwater." Sketch to scale, p. 36.

† Whidbey, "Phil. Trans." 1823, part i. pp. 78–81. Cited "Devon. Assoc. Trans.," vol. i. part i. pp. 254-5.

‡ Clift, "Phil. Trans.," 1823, part. i. pp. 81–90. Cited "Devon. Assoc. Trans.," vol. v. part. i. pp. 255–260. This separation may be partly accounted for, on the supposition of water carriage, by the difference of the relative bulk of the two sets of animals.

§ Clift, *op. cit.* Cited "Devon. Assoc. Trans.," vol. v. part i. p. 256. Dr. Buckland adds to this the tibia of a horse, and speaks of the wolf's bone as an ulna. "Reliquiæ Diluvianæ."

‖ *Ibid.* p. 257.

In the interim Oreston had been visited by Dr. Buckland, who had been working at the Kirkdale cavern, discovered in the previous year, and by Mr. Cottle, of Bristol. Dr. Buckland states that Mr. Whidbey had collected fifteen large maund baskets full of bones before his arrival, and that he saw appearances of as many more undisturbed in the upper parts of the cavity whence the others had been taken. They had apparently been "washed down from above at the same time with the mud and fragments of limestone, through which they are dispersed. . . . They were entirely without order, and not in entire skeletons; occasionally fractured, but not rolled; apparently drifted, but to a short distance from the spot in which the animals died."†

Mr. Cottle made a very large collection, in the course of which he added the lion to the Oreston fauna, by the discovery of two canines of what was then called "tiger." In the following year the other caves of the series were reached. They contained "the remains of the wolf exclusively," the whole of which fell into the hands of Mr. Cottle, who visited Plymouth again that summer. In two days he obtained forty wolf jaws; while he was told by the workmen that before they knew these remains had any value, they had thrown away as much as two cartloads. His general collection, as the result of the two visits, was described by him as consisting of:—500 bones from the tiger to the hare; 1000 fragments without direct character; 250 vertebræ; 26 skulls and portions of skulls; 3 horn cores (bull); 80 fragments of osseous breccia; 1 mass of *album græcum;* 147 jaws—2 tiger [lion], 5 hyæna, 86 wolf, 8 fox, 32 horse, 5 bull, 6 deer, 1 boar, 2 hare; 1587 teeth—11 tiger [lion], 35 hyæna, 225 wolf, 6 fox, 800 horse, 400 bull, 100 deer, 5 hare, 2 water-rat, 3 weasel.

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* Clift, *op. cit.* Cited "Devon. Assoc. Trans.," vol. v. part i. pp. 258–9. A few small fragments of shell apparently allied to *ostrea*, and having a recent aspect, were also found.

† "Reliquiæ Diluvianæ," p. 69-70. Cited "Devon Assoc Trans.," vol. v. part i. pp. 261, 262.

There are many fragments of this period in our Museum, besides some bones of more importance. No doubt the collection was once of greater value. There are two cards stating that the bones in certain drawers had been examined and marked by Dr. Buckland,* which is true of those that remain in two or three instance only.

Up to this date, with the exception of the rhinoceros, we have no record of the occurrence of the larger mammals. Mr. J. C. Bellamy stated in 1835, however, that he had seen bones of the elephant and of the hippopotamus which had been discovered at Oreston,† while in 1839 he claimed to have had such specimens in his possession.‡ He had not examined the caves himself; but his words, "I have seen both of these [elephant and hippopotamus], and likewise fragments of the skeleton of rhinoceros from thence, procured in 1822," may be fairly taken to imply that they formed part of that find. Otherwise I should be inclined to assume that they were portions of a more recent discovery; nor on the other supposition is it easy to understand how they could have escaped the trained eyes of Dr. Buckland and Mr. Clift, to say nothing of zealous Mr. Cottle. Of the hippopotamus we have heard nothing since; but the occurrence of the mammoth has been clearly established.§

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* Cottle's "Malvern Hills and Essays." Third Essay, on the Oreston Caves. Cited "Devon. Assoc. Trans.," vol. v. part i. pp. 267–281. Mr. Cottle deposited a portion of his collection in the Bristol Museum, where it now remains.

† Writing under the *nom de plume* of Philophysicus, "South Devon Monthly Museum," vol. vi. p. 221. Cited "Devon. Assoc. Trans.," vol. v. part i. p. 284.

‡ "Nat. Hist. South Devon.," p. 82.

§ Claringbull ("Guide to the Breakwater," p. 37), whose father was government surveyor of the Breakwater, states distinctly that *teeth* of the elephant and hippopotamus, with fragments of the skeleton of the rhinoceros, were found in 1822. He wrote in 1840. The collection of Messrs. J. C. and P. F. Bellamy is now deposited in King's College, London. Professor Bentley, Dean of the Medical Faculty, who kindly examined it at my request, has informed me that neither the mammoth nor the hippopotamus is represented. It seems very clear therefore that Mr. Bellamy was in error. Mr. Claringbull evidently in this matter followed him.

If, however, a statement in Col. Hamilton Smith's *Natural History of the Human Species* be strictly accurate, other caves of a notable character must have been discovered between 1823 and the publication of that book in 1848; for he mentions the occurrence of abundant coprolite, which has found no other record before or since. To that point I shall return hereafter. And indeed we do know that some caves were opened in the interim. One was found at Pomphlett in 1839, the contents of which "consisted almost wholly of the teeth of the Horse, but the bulk was undoubtedly lost in blowing away the rock."* Moreover, our own Museum supplies evidence of a discovery at Oreston in 1843, in bones and teeth of horse and ox, duly marked with place and date. Nor does it seem improbable that during the last forty years few have passed without some fossil bones occurring in the Oreston quarries, though as a rule in small quantity.

The next great find was in 1858, and must have approached, if it did not equal in extent, that of 1822–23. It was investigated in 1859 by Mr. Pengelly, who purchased all the specimens he could obtain, and forwarded the bulk of them to the British Museum. Others were deposited in the museum of the Oxford University, and in that at Leeds. I am indebted to Professor L. C. Miall, F.G.S., the curator of the Leeds Museum, for a list of the Oreston species represented in the collection there. They comprise horse, sheep, pig, *Bos primigenius*, *Ursus spelœus*, *Felis spelœus*, *Bison priscus*, *Rhinoceros leptorhinus*, and *Elephas primigenius.*† Professor

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* "Nat. Hist. South Devon.," p. 440.

† The label attached to the collection is worth quotation: "ORESTON CAVERNS.—During the excavation of a vast body of limestone at Oreston, on the left bank of the Plym, chiefly for the formation of the Plymouth breakwater, several bone caverns were discovered and destroyed. The principal discoveries were made in 1816, 1820, 1822-3, and 1858–9; and though it is to be regretted that no attempts were made to explore the caverns systematically, or under scientific superintendence, the bones and teeth they have yielded have been the subjects of several papers, in which they have been carefully described and many of them figured. Amongst the remains, those of the following animals have been identified: Ursus priscus, U. spelæus, Putorius ermineus, Canis lupus, Vulpes vulgaris, Hyæna spelæa, Felis spelæa, Rhinoceros leptorhinus, Elephas primigenius, Equus fossilis, E. plicidens, Asinus fossilis, Bison minor, Bos longifrons, and Sus. It has been stated that remains of the hippopotamus, sheep or goat, deer, camel, giraffe, and a rodent of the size of a mouse have also been detected. There does not appear to have been any indication of man."

Prestwich, F.R.S., has kindly informed me that the collection in the Oxford Museum includes pieces of bone breccia, and a number of specimens (chiefly horse) labelled Plymouth, but without further specification. The Oreston examples are not displayed, but Mr. Prestwich doubts whether they would add to the published lists. The Oxford Museum possesses the valuable collection of Dr. Buckland from Kirkdale, Kent's Hole, &c., and this is fully set out.

Many specimens of this date found their way into private hands. Our own museum was utterly neglected. Mr. Pengelly describes* this cavern as apparently in the same line as Mr. Whidbey's, "as if the various caverns had been so many enlarged portions of one and the same original line of fracture."† The quarry face was 1090 feet from the quay or river margin, and about 487 feet from Mr. Whidbey's last discovery. The face of the quarry was about sixty feet high, and the cavern, which was ninety feet long, N.N.E. to S.S.W., commenced about eight feet below the top of the cliff and extended to its base, where the bottom was not reached. At the top it was about two feet wide, gradually increasing downwards to a width of ten feet at the bottom. The uppermost eight feet were occupied with angular limestone debris, mixed with a small quantity of sand. The next thirty-two feet in depth contained "similar materials . . . (the sand being somewhat more abundant) with the addition of a considerable quantity of tough, dark, unctuous clay." Beneath this again was a bed of "dark, very tough, unctuous clay." The bones were found in connection with "a nearly vertical brecciated plate, or dyke, which the workmen denominated 'callis,'" stalactitic in origin, containing masses of the fissure breccia, and having a general thickness of about two feet. "The bones were found alike in the 'callis,' and in the mass of heterogeneous materials beside it; in the cemented and uncemented portions of the bed," "as frequently in the pure stalagmite as elsewhere." The roof of the fissure was formed of cemented limestone breccia, and Mr. Pengelly held that the cavern "originally communicated with the surface by an opening sufficiently wide to allow the passage of all its contents, and that it was thus filled."

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* "Geologist," 1859, pp. 434–444. Cited "Devon. Asssoc. Trans.," vol. v. pp. 295-300.

† Mr. Pengelly bases this view on the information as to position of an old quarryman; but it is not probable that the caverns of 1816 and 1820 were connected with that of 1858, if those of 1822–3 were, because Mr. Whidbey expressly states that the two earlier caverns were 180 yards to the east of the latter. (See *ante.*)

This cave contained the remains of herbivores chiefly, with a few carnivores; the animals represented including the mammoth, rhinoceros, cave lion, cave bear, wolf, horse, ox, deer, and hog. Mr. H. C. Hodge states that the remains of elephants found belonged not merely to very young, but to somewhat mature animals; that there were numerous teeth of elk or deer and ox, but no antlers or horn cores (a fragment of the base of an antler and one small horn core excepted); that the canine of a lion measured 5¾ inches in length; that both *Equus plicidens* and *E. fossilis* occurred, with teeth referable to the ass or zebra; that of the carnivores teeth of bears predominated, indicating two species; and that there were no remains of hyænas or their coprolites.

From 1859 until 1878 no further discovery of any importance was made, though a few bones occasionally occurred. Early in June last, however, Mr. J. Goad, of the Phœnix Marble Works, informed me that bones had been found in the course of working the Pomphlett Quarry, near Oreston, and that he had directed their preservation. He kindly offered to give whatever might be found to our Museum, and to place the working of this new ossiferous fissure under my care. I at once examined the bones discovered, the most notable object in which was a horn core. To this we are indebted for our knowledge of the deposit. The foreman of the quarry had asked his employer for a horn to give the usual blasting signals; but when he received it said he thought he could have done without, as the core, which he then produced, and which had been found in the interim, might have been made to answer the purpose. Mr. Goad, however, saw the importance of the core in another light, ordered all that might be found to be preserved, and communicated with me.

Two days afterwards we visited the place together. Pomphlett Quarry closely adjoins Pomphlett Creek on the west, and is at the extreme end of the Oreston range of quarries from the point where the original discoveries were made. The artificial cliff is nearly ninety feet high, and the floor of the bone-bearing fissure was about twenty feet from the surface, seventy feet therefore above the bottom of the quarry. We had to clamber up by the aid of a rope.

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* "Geologist," 1860, pp. 26–30, 343–7. Cited "Devon. Assoc. Trans.," vol. v. part i. pp. 300–8. Mr. Hodge also suggests that other teeth belonged to the giraffe and the camel, and a "few hollow conical teeth" to immense reptiles. He likewise notes the occurrence of a "small rodent the size of a mouse," and records teeth of sheep or goat, about the genuineness of which he was doubtful.

The quarry, which faces north, had been worked in such a way as to leave a kind of rocky promontory, on each side of which the stone had been removed for a varying distance ranging up to fifty feet. The beds had the usual general dip, subject to slight variations, a little west of south at an angle of about 30°. The rock was of a very open character, and the description by Dr. Buckland of the appearances of 1822 applies to it with singular appropriateness.

"There is an artificial cliff ninety feet in height, the face of which is perforated and intersected by large irregular cracks and cavities, which are more or less filled up with loam, sand, or stalactite. These apertures are sections of fissures and caverns that have been laid open in working away the body of the rock, and are disposed in it after the manner of chimney flues in a wall. . . . Some of them have lateral communications with adjacent cavities, others are insulated and single; some rise almost vertically towards the surface, others are tortuous, passing obliquely upwards, downwards, inwards, and in all directions in the most irregular manner through the body of the rock."*

At the foot of the quarry, immediately beneath the cavity, was a talus of earth and clay mingled with fragments of limestone, in the more clayey portions of which were small fragments of bone. On ascending to the cave I found it had the appearance of a shelf. This was due to the fact that the men had opened on it longitudinally, and taken away the western side (it ran with the jointing nearly north and south, a little to the westward), while the eastern wall and the greater portion of the floor remained intact. The cave dipped with the bedding at an angle which would have brought it to the surface some fifty feet north of its northern extremity; but the rock there had long been worked away, and the quarrymen, although they had no doubt the cavern originally "came to grass" in that way, could not speak positively on the point. There was still remaining however tangible evidence of surface communication in a perpendicular plane, in an earth-crusted joint face, which extended from the roof of the cave to the top of the quarry. The portion of the cavern which remained was twenty-five feet in length, from four to six feet in height, and it had probably averaged three to four feet in breadth. At its inner extremity it continued downwards, but was there filled with limestone debris mixed with clay. The bones had been found at the innermost point of the cavity, immediately above this downward continuation, embedded in a matrix of very dense, tough, red clay, of that peculiarly fatty character which has been attributed to the decomposition of the fleshy portions of the carcases. Some of this clay remaining *in situ* beneath an overhanging part of the east wall of the cave, was full of fragments of bone, mostly small, while the larger pieces were as a rule so tender that the effort to extract them intact was almost hopeless.

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* "Reliquiæ Diluvianæ," p. 67. Cited "Devon. Assoc. Trans.," vol. v. part i. p. 260.

Mr. Goad consented to have the cave, so far as that was practicable, worked out independently; and while this was in progress I visited the quarry, and received the bones, carefully examining also the clay removed. The quantity found, however, after the first day or two was not large, and at last the supply seemed exhausted, the clay having been all worked out, and only coarse, rubbly limestone *débris* remaining. The same care, however, continued to be exercised, and it was eventually rewarded during my absence for a few days by another find—in clay beneath this *débris*—small in quantity, but important in character, and evidently a portion of the same deposit. Altogether bones were then found at intervals for about two months.

The remains are chiefly those of the aurochs, *Bison priscus*, which was not recorded as having occurred previously in the bone caves of Oreston (though its bones had certainly been found there), and which I had therefore the pleasure of definitely adding to our cave fauna. There are other bovine bones (*Bos longifrons*), some of the red deer (*Cervus elaphus*)* and several obscure fragments. All, however, are of the ruminant order, with the exception of a canine of bear, fragments of a second, and a few bones of birds, about the size of those of a duck. The whole are now in our Museum.

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* Mr. Davies, F.G.S., of the British Museum, kindly identified a number of the bones which I submitted to him, including those of the red deer, and a sacrum of a small *equus* (ass ?) found in the Mill quarry adjoining.

Of the aurochs we have the horn core mentioned, with pieces of a second, fragments of the skull, portions of the left ramus of the lower jaw with several teeth, a perfect vertebra, portions of pelvic bones, a humerus, an ulna, metacarpal, and metatarsal bones; a number of phalanges, including a perfect ungual phalanx, and the phalanges articulating therewith, sesamoid bones, fragments of ribs, &c., indicating the presence of the entire animal, though the bones were evidently re-deposited.

The horn core ranks among the finest that have been found. Its extreme outer length is 15¼ inches, and its girth at the root is 11⅞ inches. The breadth of the longer basal axis is 4 inches, of the shorter 3¼ inches. The extreme depth of the cavity is 4¾ inches, and the greatest thickness of the shell at the root 1 inch. On the straight its length is 14 inches, and its weight before it was dried was 3 lbs. 15 ounces. When found the tip of the core had been broken off, and these measurements apply to its imperfect condition. A few days later the extremity of the tip turned up. It was 4½ inches in outer length, 3¾ on the straight, and its width at the point half an inch. In general section the core is an irregular oval, flattened towards the tip. As it is evident that at least three or four inches of the core between the larger and smaller portions are still wanting, the total length of the horn when perfect and coated exceeded two feet. The aurochs to which it belonged, therefore, must have been a formidable beast, its horns spreading from tip to tip, including the frontal breadth of skull, upwards of five feet.

Of *Bos* we have a number of vertebræ, chiefly broken, a humerus, leg bones, some very perfect, phalanges, teeth, and the left ramus of lower jaw.

The remains of *Cervus elaphus* include portions of humerus, ulna, metatarsus, and a fragment of jaw.

The fissure which has been already noticed as continuing the cavern downwards was subsequently to the discovery worked upon, and its clayey contents removed. They yielded nothing, however, in the way of bones from August until March, when the base of a canine of bear was discovered.

This brings the history of the Oreston bone caves down to the present date.

And now for a point of special importance. Had the earlier investigators of our bone caverns been true to the claims of science, the question of the antiquity of man would not have been left to be settled by the present generation. Unfortunately, with rare exceptions, they either failed to recognize the importance of the association of human relics with these of the extinct genera of mammals, or, biassed by preconceptions to which they attempted to make the results of their investigations square, they shut their eyes to the evidence on the other side; nay, in certain cases wilfully destroyed it. Something must be forgiven men who suddenly found themselves face to face with facts which upset their most cherished convictions; and had such been content with simple credulity, we might have respected their prudence. But there is no excuse for deliberate falsification, or for the suppression of testimony vital to the settlement of the question in hand.

Mr. Mc Enery found human bones in Kent's Cavern, and was alleged to have concealed the discovery, from an over-anxiety to support the views of Dr. Buckland. Mr. J. C. Bellamy, however, quotes a letter from Mr. Mc Enery, in which he admits the discovery fully and frankly: but sets up a theory intended to deprive it of all special importance. "I have," he says, "found human bones and works of art . . . *beneath* the stalagmitic crust, and in association with the relics of fossil mammalia; but decidedly under such circumstances as left no doubt on my mind of their having been introduced *subsequently* to the fossil bones."* He had his theory that man and the mammoth did not coexist, and by it interpreted the phenomena. Systematic observers of later date, free from such preconceptions, have proved that his hypothesis of interment utterly fails to account for the presence in Kent's Hole of many relics of the human frame and handiwork. There, however, for many years the question remained.

In the case of the Oreston caves, the destruction of the evidence of the inosculation of the bones of man and the extinct mammals was wilful; and few are aware that any human remains were ever found in them. In a most important passage in his *Natural History of the Human Species,*† Col. Hamilton Smith says: "Before that period [1833], and repeatedly since, caves have been opened by quarrymen at Oreston, near Plymouth, several of which had bones, such as of Elephant, Rhinoceros, Ox, Horse, Hyæna, and abundant coprolite, denoting that they had been the dens of Carnivora. Among them we detected the upper portion of a humerus of man, which was immediately thrown away upon being pointed out to the possessor." And he adds in a note, "This is not the only instance of the kind. Collectors, in the plenitude of ignorance and prepossession, determined that human bones were of no consequence."*

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* Nat. Hist. South Devon., pp. 95–96.

† This is not in Mr. Pengelly's Oreston Cave Literature, but will be found in his "Literature of Kent's Cavern," published in the previous year. "Trans. Devon. Assoc.," vol iv. part ii. p. 483.

Who this scientific heathen was Col. Smith does not say; but the event must have happened before 1848, when the book was published. Mr. Bellamy and Mr. Cottle both aver distinctly, that up to the time when they wrote no human bones had ever been discovered in this connection.

We now come to the Hoe. It is doubtful whether, in the ordinary acceptation of the phrase, the Hoe limestone has any ossiferous caverns of consequence. Caves have occurred on the Western Hoe, the most important of which was described by the Rev. R. Hennah in a communication to the Geological Society. He spoke of it as abounding in stalactites; but as containing no bones of importance.

There are connected with the Hoe two forms of recent deposits —one occurring in fissures, the other lying on water-worn shelves in the sea-face of the cliff. The first is clearly alluvial, due to the action of water which formerly flowed over the plateau.† It varies in character between clay, sand, and pebbly gravel, and is in the main clearly a detritus of Dartmoor origin. It is found on the very summit of the plateau, and in some of the fissures extends to an unknown depth. The other deposit,‡ now in the main removed, though doubt has been cast upon its character through a confusion of the two, was clearly a raised beach, and occurred at an average elevation above sea-level of about thirty feet. The contents of the fissures, and the materials of the raised beaches, have really nothing in common beyond certain casual exterior resemblances; but these resemblances and their contiguity have frequently caused them to be confounded.*

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* pp. 95–96.

† *Vide* my descriptions: "Devon. Assoc. Trans.," vol. vii. pp. 150–3; "Plym. Inst. Trans.," vol. v. pp. 472–4; "Quar. Jour. Geo. Soc.," Aug. 1876, p. 237.

‡ Described and figured by Mr. Bellamy, "Nat. Hist. South Devon.," pp. 114–119. It contained marine shells, and the shells of pholades still remained in their borings on the shelf.

The first palæontological discovery recorded in connection with the Hoe was in 1808, when there was found in a bed of fine sand in a fissure, "at least fifty feet above high-water mark," unconnected with the raised beach, "one side of the jaw of some nondescript animal. The teeth, of which there is a double row, are each nearly two inches long, and the jaw about eighteen inches, and evidently carnivorous." A vertebra was also discovered 9¼ inches diameter by 4½ inches deep. "There is no perpendicular hole for the spine; but three holes pass horizontally through the centre."† Mr. Busk, to whom this description was submitted by Mr. Pengelly, can only suggest that the animal might have been a large saurian of some kind; while the vertebra, if the neural arch were not broken or worn off, "must have been a caudal one, and belonging to a creature bigger than a large whale." Mr. Busk adds, "On the whole I think the mystery, from the given data, is to me inscrutable."‡ Though the word "side" should indicate that only one ramus was found, it may be that the term was loosely used here to indicate the lower jaw as opposed to the upper, in which case the animal might very well have belonged to one of the cave series. The assumed vertebra may not have been a vertebra at all; but a description which baffled Mr. Busk must be very far beyond me.

The most important discovery of ossiferous remains on the Hoe took place about forty years (1838?) ago. The facts were recorded by Dr. Moore. The bones were found ten feet beneath the soil, on the top of the raised beach, which at its base was thirty-five feet above high water springs. The remains specially enumerated are "a molar and part of the jaw of a young elephant; a femur of a rhinoceros, maxillary bones of a bear, with the molar and palatine processes, and two teeth in each; an entire right lower ramus with teeth and tusks, the latter much worn; four separate tusks; several fragments of long bones; fragments of jaws of the horse containing teeth; numerous loose teeth; portions of long bones, and two caudal vertebrae; likewise portions of a deer's jaw containing teeth. . . . The vertebra of a whale much rounded were also discovered, with undeterminable portions of ribs."* "The quantity of fragments of leg bones amounted to several bushels, being exceedingly fragile, and deprived of their animal matter; the whale's vertebra and bear's tusks appeared much worn, as if by long-continued friction in water."†

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* Mr. J. H. Collins, F.G.S., in a paper read before the British Association in Plymouth (Report 1877, Trans. Sec., p. 68), came to the conclusion that the deposits he examined were not raised beaches. And here I agree with him; for most of the raised beach has long been worked out.

† "Monthly Mag.," vol. xxvi. p. 191; "Devon. Assoc. Trans.," vol. ix. p. 428.

‡ "Devon. Assoc. Trans.," vol. ix. p. 430.

Now it is clear that the bulk of the bones could not have been roughly used after deposition, however much some of the examples might have been. It is clear also that as the bones were found *on* the beach and not *in* it, they were placed there subsequently to the origin of that marine deposit. How can they be accounted for more simply than by the hypothesis that they came from a pre-existing ossiferous fissure or fissures, precisely analogous in character to those at Oreston?‡ Dr. Moore speaks of "nearly the entire collection of bones" as "similar to those formerly obtained from the limestone caverns of Oreston, Yealm Bridge, Kitley, and Kent's Hole."§ He does not mention the hyæna, but it is included among the specimens from the Hoe deposited in our Museum by him; and as some bones in the collection were labelled "from the Hoe fissures," it seems probable that there were other discoveries beside those of the raised beach, though in all likelihood at much the same date.

That bones should find their way from the fissures to the ancient beach is nothing wonderful. The tooth of a rhinoceros was found by Mr. Hearder on the present beach "at the entrance of the cave under the Hoe . . . . rounded by its exposure to the tide which now flows into it."|| Mammoth teeth have been found here under similar conditions.

The most interesting discovery in direct connection with the

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* "Proc. Geo. Soc." vol. viii. pp. 589–90; "Devon. Assoc. Trans.," vol. ix. p. 427.

† "Rep. Brit. Assoc.," 1841, Trans. Sec., pp. 62–63; "Devon. Assoc. Trans.," vol. ix. p. 426.

‡ This is a point on which Mr. Pengelly and myself hold differing views. *Vide* "Devon. Assoc. Trans.," vol. ix. pp. 425–431; vol. x. pp. 404–410.

§ "Rep. Brit. Assoc.," 1841, Trans. Sec. p. 63. "Devon. Assoc. Trans.," vol. ix. p. 426.

|| "Nat. Hist. South Devon," p. 439.

Hoe fissures was made about the year 1844 by Mr. Edyvean. Observing about twenty feet above the path under the Hoe, close to the wall which divides the Hoe from the quarry, something pointed projecting from the soil, he took steps to dig it out, and unearthed two elephant tusks. One in the process of removal crumbled into cubical fragments. The other broke into three parts, but otherwise continued intact. One of these sections, retained by Mr. Edyvean, fell to pieces, however, while being dried for the purpose of being coated with a preservative composition. This tusk was six feet two or three inches in length, and two feet nine inches in girth at the base.

Ossiferous caves have been discovered at Stonehouse, but the information concerning the earlier is very scanty. The first was opened somewhere about 1835.* Another is said to have been discovered while the works of the Great Western Docks were in progress; but there is no trustworthy record of what either contained. About 1865 a cavern in the quarry above the Docks, on the Battery Hill, near the old Yacht Club house, was also found to be ossiferous, and some of the contents, obtained by Mr. C. Spence Bate, F.R.S., are deposited in our Museum. They include remains of rhinoceros, horse, ox, and deer. Of *Equus* two species are represented, one probably *asinus*. Of ox there are bones of the *Bos longifrons*. Of deer there are two species at least. The most remarkable bones of this series are the remains of antlers of red deer, *Cervus elaphus*, of great size, and part of the skull, with stumps of horns attached. The complete series was presented by Mr. Spence Bate to our Museum.

Within the past few weeks (February, 1879) the resumption of the quarrying operations at this point has resulted in the finding of other bones in the remaining portion of the same cave. These were kindly brought under my notice by Mr. F. Brent, who has presented them to our Museum. The quantity is small, but the collection includes the tip of an antler (probably of *Cervus elaphus*), a fragment of a rhinoceros bone, and a calcaneum of horse.

Caverns are much less frequent towards the western extremity of the limestone, and no ossiferous deposits therein have hitherto been recorded. I learn, however, that in 1861, while operations were in progress for the construction of the battery adjoining the grounds of the General's house, Mount Wise, part of the rock was hewn away, revealing fissures in which bones in small quantity were found. The remains included those of deer (*Cervus elaphus*) and horse. Some of the bones were obtained by Mr. Codnor, of Morice Town, and a cervine tooth, found by him, has been presented to our Museum by the Rev. W. Sharman.

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* "Nat. Hist. South Devon," p. 440.

The fissures at Cattedown have yielded bones, but only occasionally and in small quantity. We have in our Museum a fragment found sixty feet deep, in clay, presented by Mr. Sparrow.

The accompaniments and investments of the bones have varied greatly. Few have been found in what may be regarded, in the special sense of that term, as cave earth. Mr. Whidbey's first find was imbedded in solid clay; his second lay on a thin bed of dry clay in the bottom of the cavern; some of the third adhered to the walls of the cavity, others were covered with dirt, and part were lying on the dirt and in crevices; to which Mr. Clift adds: "Some of the bones . . . which lay on and near the surface of the clay have acquired a thin crust of stalagmite . . . the greater number were imbedded in the stiff clay, which adhered so firmly to them that many were broken by the workmen in separating them from the matrix."* Dr. Buckland † describes the bones of 1822 as "lodged in irregular heaps in the lowest pits [of a "deep hole nearly perpendicular"], and in cavities along the lateral enlargements of this hole, and mixed with mud, pebbles, and fragments of limestone;" while Mr. Cottle, referring to the discoveries of the following year, mentions that in two days forty jaws of the wolf were found imbedded in clay, while in another cave without clay two hundred phalanges of the wolf were found "in parallel rows," beneath a large stone which had fallen from the roof; the remaining bones in this particular cavity having been united by stalagmitic matter with limestone fragments into a breccia. However, in the principal cave, where the bottom was covered with a stratum of red clay, "the greater portion of the bones lay promiscuously scattered over the surface of the clay, or had but partly sunk into it."‡ The Rev. R. Hennah says the bones of 1822 were "enveloped in a mass of apparently black mould and clay," and in some cases brecciated.§ The bones of

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* *Op. cit.* Cited "Devon. Assoc. Trans.," vol. v. part i. pp. 254-256.

† *Op. cit.* Cited "Devon. Assoc. Trans.," vol. v. part i. p. 264.

‡ *Op. cit.* Cited "Devon Assoc. Trans.," vol. v. part i. pp. 269-270.

§ "Lime Rocks of Plymouth." Cited "Devon Assoc. Trans.," vol. v. part i. p. 282.

1859 are described by Mr. Pengelly as associated with a mass of heterogeneous materials, consisting of limestone *dêbris*, sand, and "tough, dark, unctuous clay," partially cemented by stalactite, and "in the cemented and uncemented portions of the bed.[*]

Mr. H. C. Hodge, writing of the discoveries of the same date, implies that the bones were generally found on or in a soft, dark-red, tenacious clay.[†] The bones in the Pomphlett cave of 1878 were invested by a dark-red, tough, greasy clay, which where the bones were thickest at once—as already noted—suggested the value of the hypothesis of Sir H. De la Beche, that some clay observed at Oreston by him was "apparently impregnated with animal matter."[‡] The bones found at Cattedown were in clay; on the Hoe they have been associated with sand and gravel. Those found on the raised beach are of course out of our present purview.

But there are other points to be noted in these fissure deposits beyond this variation in character. Dr. Buckland says, that in one cavern at Oreston, "where the quantity of diluvium was very great, it was stratified, or rather sorted and divided into laminæ of sand, earth, and clay, varying in fineness, but all referable to the diluvial washings of the adjacent country. It is often partially interspersed with small fragments of clay-slate, and quartz."[§] I have elsewhere noted associated phenomena in connection with the alluvial deposits on the Hoe. At Deadman's Bay there are the remains of a huge pocket deposit of similar character, chiefly consisting of white clay. At Long Room I have recently found quartz pebbles in the earthy filling of small fissures in the limestone there. At Yealm Bridge there are caverns containing waterworn *dêbris* identical in character with the materials of the river bed many feet below. Similar appearances have presented themselves in connection with the fissures at Billacombe.

Since I first directed attention to the Hoe deposits, they, with others at Deadman's Bay and Mount Batten, have been examined by Mr. J. H. Collins, who found therein pebbles of quartz, limestone, schorl rock, greenstone, grit, clay-slate, tourmaline schist, granite, elvan, flint, chert, all of which he considered had been derived from the rocks of the neighbourhood, and thus confirmed my views on this point, though we differ upon some others.*

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[*] *Op. cit.* Cited "Devon Assoc. Trans.," vol. v. part i. p. 298.

[†] *Op. cit.* Cited "Devon. Assoc. Trans.," vol. v. part i. p. 303.

[‡] "Rep. Geo. Cornwall, Devon, and West Somerset," p. 413. Cited "Devon. Assoc. Trans.," vol. v. part i. p. 285.

[§] *Op. cit.* pp. 82, 83. Cited "Devon. Assoc. Trans.," vol. v. part i. p. 261.

Now the fact that amidst all these differences there were still some connecting links of similarity, led me to assume on investigation a common origin for at least the bulk of our ossiferous deposits. In all we have evidence of transportation by water. Either the bones are mixed with sand or clay, which may (as in the case of the red clay derived from the reddish earth of the limestone area) occasionally be of local origin, but must frequently have been transported for some distance; or the remains are so placed and mingled that there is clear evidence of their removal after decay. Or we have the concurrence of both conditions.

Finding that the variations in the phenomena of the different bone caverns at Oreston were as wide as those between the ossiferous deposits of Oreston generally and the deposits of the Hoe, while they were yet associated in the manner already described, I was led to suggest that "the caverns were in the main contemporaneous with the surface formations [of the Hoe], and date back to a time when the limestone rocks which enclose the fissures were but slightly raised above the waters, and when therefore nothing was easier than the introduction into the caverns of bodies of animals swept down the stream, probably in times of flood, just as they are commonly swept down the rivers of tropical countries in the present day." †

This was the first attempt at the definite correlation of our most important and typical series of Quaternary deposits; and my conviction that the solution of the problem here propounded is the true one remains unshaken. ‡ Perhaps its bearing and importance will be best indicated by reference to the rival hypotheses. §

I know of only three authorities for the opinion that any of the Oreston caves were dens; that is, were used as the homes of carnivora.

The Rev. R. Hennah, writing in 1822, supports the conjecture

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* "Brit. Assoc. Rep.," 1877, Trans. Sec., p. 68.

† Geology of Plymouth, "Plymouth Inst Trans.," vol. v. p. 475. "Quar. Jour. Geo. Soc.," Aug. 1876, p. 237.

‡ *Vide* "Devon. Assoc. Trans.," vol. ix. pp. 436–440; vol. x. pp. 404–410.

§ Mr. Collins comes to the same conclusion that "gravels, fissure deposits, and cave deposits are of the same age," and "that they belong to the mammoth period."—"Brit. Assoc. Rep.," 1877, Trans. Sec., p. 68.

"by the shattered appearance of the ends of many of the bones, and the sharp splinters, which are in great numbers, and seem as if they had been gnawed, and broken by the teeth of some animal."*

Mr. Cottle mentions the discovery of one mass of *album græcum.*†

Col. Hamilton Smith speaks of several of the caves as having "bones, such as of Elephant, Rhinoceros, Ox, Horse, Hyæna, and abundant coprolite, denoting that they had been the dens of Carnivora.‡ This must have been before 1848.

That Mr. Hennah was wrong in his conclusion here we may safely assume, from the strongly expressed opinion to the contrary on these very bones by Dr. Buckland and Mr. Clift. Bones may be shattered and splintered without the agency of carnivora; and there was no evidence whatever of contemporary gnawing.

Nor is Mr. Cottle's discovery of any moment. A few coprolites or masses of *album græcum* might very well occur where the bodies of animals had been deposited while intact.

Col. Hamilton Smith's statement is not so easily met. It would be conclusive if he also mentioned gnawed bones; but as it stands there is the possibility of other things having been mistaken for coprolital matters, probably clay balls, such as those noted by Mr. Pengelly in 1859. In any case however the reference is to a cave on which we have absolutely no other information; and there is nothing at all improbable in the supposition that Oreston may have had its den as well as Yealmpton and Torquay. I have always recognized the possibility of this; but if so the case was exceptional, and does not affect the general issue. Were all, or even the majority, of the Oreston bone caves dens the question would stand upon a different footing.

Dismissing then the hypothesis of the introduction of the remains into the fissures by carnivora as unsupported by facts, and practically irrelevant, we have to deal with the phenomena on a mechanical basis. At one time or other every cavity had its communication with the surface, approximately perpendicular, as in the case of the fissure caves, approximately horizontal, as in the case of the tunnel caverns, but either way open to the action ot running water.

Dr. Buckland's hypothesis was that "the animals had fallen during the antediluvian period into the open fissures, and there perishing, had remained undisturbed in the spot on which they died, till drifted forwards by the diluvian waters to their present place in the lowest vaultings with which these fissures had communication." *

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* *Op. cit.* p. 67.

† *Op. cit.* "Devon. Assoc. Trans., vol. v. part i. p. 273.

‡ "Nat Hist. Human Species," p. 96.

Mr. Cottle (if I rightly understand him) suggested that the animals rushed headlong into a horizontal passage communicating with the main chambers, to escape the waters of the deluge, and were drowned in the trap into which they were thus precipitated.†

I shall not enter upon the discussion of the deluge theory, though it has been recently revived by Mr. Howard, F.R.S. The evidence is utterly opposed to the action of *any* agency of a cataclysmal character.

Mr. Pengelly held in 1859 that the cavern of 1858 "originally communicated with the surface by an opening sufficiently wide to allow the passage of all its contents, and that it was thus filled; but whether animals fell or were dragged in, or whether the bones found there were wholly or partially the disjointed remnants of dead animals washed in, I will not undertake to say."‡ In 1877, however, Mr. Pengelly's views were more definitely expressed, as he did not see "the least occasion for supposing anything more than a series of gaping fissures, traversing a table-land, above the reach of flooded rivers—though not necessarily or probably of great elevation—into which some animals fell and were killed, and others retired to die; where, perhaps, a few were dragged or pursued by beasts of prey; whilst the rains of Devonshire washed in at least some of the bones of those which died near at hand on the adjacent plateau."§

The intimate association and order of many of the bones proves that at the time of deposition these were partially united by ligaments, if not invested with flesh; while the manner of admixture of the remains of various animals in some cases shows that with them at least there was redeposition after decay. That water played some part in the production of the phenomena is admitted on all hands; and that the carrying force of this water must have been considerable is proved by the magnitude of the bodies transported, and by the character and quantity of the materials of the associated deposits.* These facts seem to indicate the existence of a more definite agency than the casual entrapments of open fissures; a more powerful one than the downpour of even a tropical thunderstorm.

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* *Op. cit.* Cited "Devon. Assoc. Trans.," vol. v. part i. p. 265.

† *Op. cit.* Cited "Devon. Assoc. Trans.," vol v. part i. p. 274.

‡ *Op. cit.* Cited "Devon. Assoc. Trans.," vol. v. p. i. pp. 299–300.

§ "Trans. Devon. Assoc.," vol. ix. p. 440.

While quite admitting the possibility of some animals having dropped into ancient pitfalls, and the equal possibility that some of the cavities may have been the occasional resort of beasts of prey, the evidence then seems to be conclusive that the great bulk of the deposits must have had the fluviatile origin suggested; and that we have in them the local equivalent of the ancient river gravels which have elsewhere been found so rich in the relics of the mammoth and its associates, preserved in the cavities of the limestone from the denuding influences which have removed it elsewhere. To distinguish the cavern deposits from the fissure—using these terms in their most distinctive sense, seems to involve the conclusion that in the same locality two similar results were produced simultaneously by two wholly different sets of causes.

The materials at command are not adequate to the tabulation of the various "finds" in chronological order of origin. Assuming the correctness of the fluviatile hypothesis, they may still be spread over a considerable period; and if any of the caves were "dens," the time-range must have been long enough to have placed the cavities so occupied above the general reach of the waters, while the character of the fauna remained practically unchanged. Nay, it is quite possible that when the deposits originated, some of the caverns into which portions have since found their way had no adequate surface communication.

As to the general date of the period to which these remains belong. It was certainly sufficiently remote to allow of the production of a present change of some 100 feet in the relative local positions of land and water, and beyond that of a pause of sufficient duration for the formation of the raised beach, with the time occupied in the continued elevation and subsequent depression of the submerged forest.† I cannot express the interval in any more positive way. One step further is, however, possible. The lowest deposits in Kent's Cavern, known as the Ursine beds, have yielded no remains of hyæna; and Mr. Pengelly argues thence that the hyæna did not reach this country until after the Ursine period, when Britain was in its last continental state.[*] As our ossiferous deposits are referable to one epoch, and include the hyæna, they must therefore have originated either during the continuance of, or subsequent to, that final continental condition.

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* If it is safe to argue out the main question from the recorded phenomena of 1822 and 1878, when the ossiferous deposits were found in the southern ends of the cavities, the inference would be that the current came from the northward, *i.e.* more in the line of the Tamar than the Plym.

† *Vide* Geology of Plymouth, "Plym. Inst. Trans.," vol. v. p. 468.

Professor Boyd Dawkins, F.R.S., in his *Treatise on the British Pleistocene Mammalia*, points out that "the present wild animals of Europe are merely the survivors of a large and varied group that lived on the Pleistocene continent.[†] Between the Pleistocene period and our own time lie his Prehistoric and Historic periods, the latter commencing for every country with its first authentic record, and the former filling up the interval between it and the Pleistocene. "It is characterized by the advent of the swine, dog, sheep, goat, and the domestic horse and oxen into Europe under the care of man."[†] We have scant information concerning the date of extinction of our wild animals of Pleistocene times. Professor Dawkins holds it to be probable that the wolf was exterminated in England and Wales before the end of the fourteenth century,[‡] while Pennant says that the last in Scotland was killed by Sir Ewan Cameron in 1680. According to tradition the last wolf in Cornwall was killed in the parish of Ludgvan somewhat earlier. The wild boar became extinct before the reign of Charles I.; the beaver was hunted for its fur in Wales in the twelfth century; the bear existed in England during the Roman occupation; the reindeer lingered on in Caithness until the twelfth century, and died out about the same time as the beaver. All the other extinct representatives of our Pleistocene fauna had disappeared before historic times; but there is nothing, unless it be the doubtful inosculation of the sheep, to indicate whether our cave deposits belong to the Pleistocene period as distinguished from the Prehistoric or not.[§]

In conclusion I have to present a tabular statement of our local cavern fauna, in which uncertain are distinguished from specific identifications, and the fauna of every "find" shown independently.

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[*] See "Rep. Brit. Assoc.," 1877, Trans. Sec., p. 65, for a valuable comparative chronological table of the Kent's Cavern periods, by Mr. Pengelly.

[†] "Palæontographical Society," 1878, p. vi.

[†] *Ibid.* pp. vi., vii.

[‡] *Ibid.* pp. x., xi.

[§] Dawkins, *op. cit.* p. xi., xii.

	ORESTON.							HOE.		STONEHOUSE.		MOUNT WISE.	CATTEDOWN.
	1816.	1820.	1822-3.	Year uncertain.	1843.	1858-9.	1878-9.	1838 (?)	Year uncertain.	1865.	1879.	1861.	
Homo—Man				*									
Elephas primigenius—Mammoth			?			*		*	*				
Rhinoceros			?					*					
,, tichorhinus						*				*	*		
,, leptorhinus	*	*				*							
Hippopotamus			?										
Felis spelæa—Cave lion			*			*							
Ursus—Bear								*					
,, priscus—Grizzly bear		*	*				*						
,, spelæus—Great cave bear		*	*			*							
Hyæna spelæa—Cave hyæna			*					*					
Canis lupus—Wolf			*			*							
Vulpes vulgaris—Fox			*										
Putorius ermineus—Weasel			*										
Equus—Horse				*								*	
,, fossilis—Fossil horse			*		*	*	*	*		*	*		
,, plicidens—Plicated toothed horse			*			*							
Asinus fossilis—Fossil ass or zebra			*			*				*			
Bos—Ox					*								*?
,, primigenius						*							
Bison priscus—Aurochs						*	*						
,, minor—Lesser bison			*										
Bos longifrons—Long-fronted ox			*				*			*			
Cervus—Deer		*						*					
,, —Large or elk						*							
,, —Small			*							*			
,, elaphus—Red deer							*			*	*	*	
Sus—Hog			*			*							
Ovis—Sheep (or Capra, goat)				?		?		*					
Lepus timidus—Hare			*										
Arvicola aquatica—Water rat			*										
Rodent, size of mouse						*							
Aves—Birds							*						

The authorities for this table are for the most part already given; but it is desirable to add a few notes by way of further elucidation.

The mammoth has had a very remarkable range in space and time. Professor Boyd Dawkins, in a paper read before the Geological Society in London in November last, " expressed his opinion that the result of the evidence collected since the death of Dr. Falconer has been to establish the view of that palæontologist as to the mammoth having appeared in Britain before the glacial epoch. In 1858 remains belonging to *E. primigenius* were found by Prof. Prestwich under boulder-clay in Hertfordshire. In Scotland remains of *E. primigenius* have been found under boulder-clay;

but whether under the oldest boulder-clay is uncertain. In 1878 a portion of a molar was brought up from a depth of sixty-five feet near Northwich. It was in a sand beneath boulder-clay, which the author considered to be undoubtedly the older boulder-clay." Prof. Boyd Dawkins "now assents to Dr. Falconer's opinion (which he formerly doubted) that *E. primigenius* was a member of the Cromer forest-bed fauna. It is also clear that it was living in the southern and central parts of England in postglacial times. It has not been found north of Yorkshire on the east, and Holyhead on the west, probably because Scotland and north-west England were long occupied by glaciers. Its remains have been found" in Europe "as far south as Naples, and as far north as Hamburgh; but not in Scandinavia. Its remains, as is well known, abound in Siberia, and it ranged over North America from Eschscholtz Bay to the Isthmus of Darien, *E. columbi*, *E. americanus*, and *E. Jacksoni* being only varieties."

Professor Owen assigned the rhinoceros remains of 1816 to the tichorhine species; Mr. Busk identifies them as the leptorhine, which has never been found in cavern deposits elsewhere, except in the Victoria Cave, Settle. Dr. Falconer held that the earlier rhinoceros remains belonged to *R. hemitæchus*. "They are quite unlike *R. tichorhinus*, and I believe that they agree with *R. hemitæchus*."* Mr. Pengelly lodged relics of the tichorhine species in the British Museum in 1859,† and Mr. Miall informs me that the Leeds Museum has bones of the leptorhine.

Like the ascription of the mammoth and rhinoceros to the 1822 find, the occurrence of the hippopotamus, which likewise rests on Mr. Bellamy's sole authority, is more than doubtful. Professor Owen cites it from Kent's Hole.‡ Mr. Pengelly has "never met with satisfactory evidence of its occurrence in Devonshire."§ We have, however, in our Museum two fragments of jaw so assigned by Mr. Northmore, part of the results of that gentleman's Kent Hole investigations.

Some of the bovine bones of 1820 appear to have belonged to *Bos longifrons*. Though the remains of deer have been of frequent occurrence, no attempt at their specific identification appears to have made until Mr. Davies, of the British Museum, kindly examined those found by me at Pomphlett, and pronounced them to belong to the red deer—*Cervus elaphus.* It is, however, quite certain, from the manner in which previous cervine remains are described, that other species were represented—*Cervus megaceros* (the Irish elk), and *Cervus tarandus* (the reindeer)—which have occurred in Kent's Hole and at Brixham, almost certainly, and not improbably *Cervus capreolus* (the roedeer). A sacrum of horse found in 1878 (in the Mill Quarry) was identified by Mr. Davies as that of a small species of *Equus,* possibly *Equus asinus,* though Mr. Davies declines positively so to pronounce it.

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* "Palæontological Memoirs and Notes of the late Hugh Falconer," vol. ii p. 309. Cited "Devon. Assoc. Trans.," vol. v. part i. p. 309.

† "Trans. Devon. Assoc.," vol. ix. p. 424.

‡ "Brit Foss Mam.," p. 410.

§ Address, Sec. C. Brit. Assoc , 1877; Trans. Sec., p. 57.

A human skull in the possession of Mr. Hodge is stated to have been found in a crevice of the rock at Turnchapel. There is however nothing by which it can be definitely associated with the cavern fauna, and I have not included it in the table. Mr. Hodge considers that some of the teeth of the 1858–9 "find" belong to the giraffe and others to the camel, no relics of either of which have, however, been found in the country elsewhere.

Mr. Hodge expresses a doubt of the genuineness of the sheep remains from Oreston. Mr. Bellamy had none with regard to those that fell into his hands. The probability is however that they were of more recent date.

The remains of hare, water-rat, the rodent mentioned by Mr. Hodge, and the weasel, may be of later origin than the general cave fauna. I am inclined to the same belief with regard to the birds' bones found by myself at Pomphlett, and which are the first of the kind recorded from the Oreston district.

Professor Owen mentions the bones of shrew-mice (*Sorex vulgaris*) as having been found "in the raised beaches near Plymouth." He also describes the hare of Kent's Hole and Kirkdale as having a rather shorter head than the common hare.*

The Plymouth cave fauna is smaller than that of Kent's Cavern, the most important particulars of difference being the yield by the latter and not by the former of *Machairodus latidens,* badger, beaver, and glutton; and that Oreston has given us the *leptorhine* rhinoceros as well as the *tichorhine,* the lesser bison, and three species of *Equus*—*fossilis, plicidens,* and *asinus*—against one, *caballus.* Though the balance is still somewhat in favour of Kent's

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* "Brit. Fos. Mam.," p. 28. *Ibid.*, p. 211.

Hole, that cavern excepted, no others in Devon can show so rich and varied a fauna as those of our own district. The annexed table gives a comparative view of the fauna of the various caves of South Devon:

	Oreston.	Hoe.	Stonehouse.	Yealmpton.	Kent's Hole.	Ash Hole.	Windmill Hill, Brixham.	Chudleigh.
Man	*				*			
Elephant	*	*		*	*	*	*	?
Rhinoceros, tichorhine	*	*	*	*	*		*	*
Rhinoceros, leptorhine	*							
Hippopotamus	??				?			?
Cave lion	*				*		*	
Brown bear		bear		bear	*		*	
Grizzly bear	*				*		*	
Cave bear	*				*		*	*
Cave hyæna	*	*		*	*		*	?
Wolf	*			*	*			
Fox	*			*	*		*	
Weasel	*			*			*	
Machairodus					*			
Fossil horse	*	*	*	horse				
Plicated toothed horse	*							
Fossil ass	*		*					
Modern horse					*		*	
Great fossil ox	*			ox	*		*	ox
Aurochs	*				*			
Lesser bison	*							
Long fronted ox	*				*		*	
Irish elk	?	deer		deer	*			
Reindeer					*	*	*	
Red deer	*		*		*		*	*
Roe deer					*		*	
Hog	*			*	*			
Sheep or goat	?	*		*	goat		*	*
Badger					*	*		
Glutton				*	*			
Hare	*				*		*	
Dog					*			
Rabbit				*	*	*	*	
Seal					*			
Cave Pika					*		*	
Voles	*			*	*	*	*	
Birds	*			*		*		
Beaver					*			
Mouse	rodent			*				
Polecat							*	
Stoat						*		
Shrew							*	

The Kent's Hole fauna, in addition to the animals specified, probably includes also *Lynx cervaria*, *Canis isatis*, and the wild cat.

With the single important exception of the Brixham Windmill Hill cave, almost all the bone caverns of the county are represented in the Museum of the Plymouth Institution, and the following is an outline of the leading features of this part of the collection. Most of the older bones from Oreston are mere fragments, the relics of what was once a fine collection. The bones in the Museum generally are either marked in full or with initials indicating their origin—O., Oreston; P., Pomphlett; H., Hoe; S., Stonehouse; Y., Yealmpton; C., Chudleigh. The Ash Hole (except the smaller) and Kent's Cavern bones are for the most part marked in full.

ORESTON, including Pomphlett.—Remains of mammoth, wolf, hyæna, bear, rhinoceros, aurochs, great fossil ox, long-fronted ox, red deer, horse (fossil and plicated toothed), ass, birds, &c. The later additions presented by Mr. R. Bayly and Mr. J. Goad.

HOE.—Mammoth, whale, hyæna, &c. Presented by Mr. J. Gill and Dr. E. Moore.

STONEHOUSE.—Rhinoceros, red deer, great fossil ox, horse, ass, &c. Presented by Mr. C. Spence Bate and Mr. F. Brent.

MOUNT WISE.—Deer. Presented by Rev. W. Sharman.

YEALMPTON.—Hyæna, wolf, ox, badger, fox, sheep, birds. Presented by Mr. J. C. Bellamy.

ASH HOLE, Brixham.—Badger, fox, raven, arvicolæ, &c.

CHUDLEIGH.—Bear, sheep, &c. Presented by Mr. J. F. Webb.

KENT'S CAVERN.—From this cave there are two collections, each interesting not only in itself, but also historically. The first was presented by Mr. Northmore about 1824–5, and includes bones of rhinoceros, bear, hyæna, deer, ox, horse, and two fragments assigned by him to hippopotamus.* The other collection is the gift of the Rev. J. Mc Enery, and from its peculiar interest, I annex a copy of the original memorandum relating thereto:

"Organic Remains from Kent's Cave.—No. 1. Tooth of the superior jaw of Rhinoceros worned down by use. 2. Molar of Inferior Jaw of Rhinoceros. 3. Molar of infr^{r} jaw of Elk. 4. Molar of sup^{r} jaw of Horse. 5. Molar of inf^{r} jaw of Horse. 6. Canine of Horse. 7. Canine of the Ursus Spelæus. 8. Incisor of do. *9. Breccia. 10. Sup^{r} Jaw of the Hyæna. 11. Inf^{r} do. 12. Canine do. 13. Pæt^{r} Molar of inf. jaw of the Hyæna. 14.

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* See *ante*. Mr. H. C. Hodge tells me the Museum once contained undoubted examples of hippopotamus teeth, though he has no knowledge of the locality. These teeth have disappeared.

Bones broken and gnawed by the Hyæna in the state they were dug up. *15. Græcum of the Hyæna. *16. Mass of the bones of Rodentia. *17. Astragalus of Rhinoceros gnawed. 18. Tibia of Rhin^{s} broken and gnawed to its actual state by the Hyæna. This collection was presented by Mr. J. Mc'Enery, of Torquay, on Nov. 23rd, 1829."

The specimens to which an asterisk is prefixed are *not* in the Museum. The remainder bear the original numerals as above.

THE CRUSTACEA TAKEN DURING THE CRUISE OF H.M.S. *CHALLENGER.*

SYLLABUS OF PAPER BY MR. C. SPENCE BATE, F.R.S.

(Read February 27th, 1879.

SPECIAL object of the *Challenger* expedition. The route and course pursued. Crustacea taken during the cruise. Their position in the animal kingdom. Their classification. The order under review. General structure of the animal. Nervous system. Organs of respiration. Organs of sense. Form and character of the young. Geographical distribution of some of the more known species in depth and area.

MITHRAS AND THE ROMAN WALL.

PAPER BY THE REV. PROFESSOR BEAL, M.A., M.R.A.S.

(Read March 6th, 1879.)

The lecturer dealt with the worship of Mithras by the Romans, as evidenced by remains found on the great wall of Hadrian, or Severus, in Northumberland. Describing the wall, he said:

Whilst the footsteps of early British occupation of this island are so abundant in Cornwall and the western districts of England; Northumberland, as Wallis has long ago remarked, is emphatically Roman ground. A dead wall indeed is not a promising field for exploration; but a wall built by Romans is something more than brick and mortar; it is a depository of records engraved on stone, which reveal to us much respecting the civilization and the religious condition of the people who brought most of the then known world under their sway.

It was on the 25th of August, B.C. 55, that Julius Cæsar first landed in Britain with a force of 10,000 men. In the following year he returned with a larger force; but tides and tempests seconded the efforts of the natives, and Cæsar bade Britain a final farewell, without erecting any fortress in the island, or leaving any troops to secure his conquest. Tacitus indeed says that he did not conquer Britain, but only showed it to the Romans; and Horace speaks of Britain as untouched—"intactus est Britannus;" whilst Propertius again speaks of it as "invictus." There was little exaggeration therefore, as Dr. Bruce has said, in the words of Shakspeare—

> "A kind of conquest
> Cæsar made here; but made not here his brag
> Of came, and saw, and overcame: with shame
> (The first that ever touched him) he was carried
> From off our coast, twice beaten; and his shipping
> (Poor ignorant baubles!) on our terrible seas,
> Like egg-shells moved upon their surges, cracked
> As easily 'gainst our rocks." *Cymbeline.*

In the year 43 A.D. Claudius sent Aulus Plautius with about 50,000 men to renew the attempt at conquest.

Dion Cassius tells us that the soldiers were unwilling to engage in a struggle, as it were, "out of the world." The year following Claudius engaged personally in the war, and advanced into the country as far as Colchester. Hence he was dubbed Britannicus, and received a triumph; and now for the first time Britain is named in the Roman coinage, as we find on several gold and silver pieces on the reverse a triumphal arch, on which is inscribed the words, "De Britannis"—"Over the Britains."

On the return of Claudius, the supreme command again devolved on Aulus Plautius, under whom also served Vespasian and his son Titus.

Ostorius Scapula succeeded in the command, against whose troops Caractacus and the Silures brought an obstinate resistance.

In the reign of Nero occurred the disastrous tragedy enacted by Boadicea, "England's warrior queen." 70,000 Romans or adherents of the Roman rule fell under her hand; but Suetonius exacted a dire revenge in the slaughter of not less than 80,000 of the British army.

Under Vespasian a new era commenced, and the Brigantes and Silures were reduced to submission; and now at length, after one hundred and thirty-three years of intermittent struggles, a fair hold began to be obtained on the most valuable portion of the island.

It remained for Cnæus Julius Agricola, who landed as governor in the year 78, to complete the work of subjugation. During the eight years of his rule he subdued the remaining tribes of South Britain; carried his arms into the northern section of the island; drove the natives before him; and at length, in the battle of the Grampians, for a while at least, he paralyzed their strength, and finally planted the Roman standard on the Orkneys. He first began on a large scale to build walls and fortresses in all places where they were required; and by fostering a taste for letters, and also for luxury, began a more certain conquest over the people by undermining their self-reliance, and indisposing them for the privations of constant warfare. And this is just what Tacitus tells us: "During the following winter [viz. A.D. 80] he occupied himself in civilizing and polishing the rude inhabitants, who, living wild and dispersed over the country, were thence ever restless, and easily instigated to warfare. At first they were prevailed upon to associate more together, and for this end were instructed in the art of building houses, temples, and places of resort. The sons of their chiefs were taught the liberal sciences; by degrees the customs, manners, and dress of their conquerors became familiar to them; they acquired a taste for a life of inactivity and ease; and at length were caught by the charms and incitements of luxury and vice. By such as judged of things from their external appearance only, all this was styled politeness and humanity, while in reality Agricola was effectually enslaving them, and imperceptibly riveting their chains."

Among other forts built by Agricola were those extending along the upper isthmus of the island, from the Firth of Forth to the Firth of Clyde; and so judiciously were these erected, that, as Tacitus tells us, "none of them were ever taken by force, abandoned through fear, or given up on terms of capitulation."

After eight years of unchecked conquest, Agricola was recalled from Britain by the Emperor Domitian, probably from feelings of jealousy.

Thirty-five years after the recall of Agricola, viz., A.D. 120, affairs had assumed such a character as to render the presence of the Emperor Hadrian necessary in the island.

He did not attempt to regain the conquests Agricola had made in Scotland, but prudently contented himself by erecting a wall across the island, which he called the Barrier of the Lower Isthmus, The evidence of Spartianus is clear on this point. "Hadrian," he says, "visited Britain, where he corrected many things, and first drew a wall (Murus) 80′ in length to divide the Barbarians from the Romans." Two coins were struck in honour of Hadrian's success. On the reverse of one is the legend "Adventus Augusti Britanniæ;" on the other a female figure seated on a rock with a shield and spear, and the legend "Britannia."

Twenty years after this Lollius Urbicus took the command. He was not content with the limits which Hadrian had fixed for Roman empire in Britain; but, forcing the natives back, he raised an earthen rampart across the isthmus between the Forth and the Clyde. This is now known in Scotland as Graham's Dyke (Celtic, *grym*, strong).

The remaining history of the Romans on the northern frontier of England is fraught with disaster; the tide of war sometimes broke on the northern and sometimes on the southern boundary, but it ceased not until the Roman intruder had been driven from the island, and then only to be succeeded by the worse horrors of civil wars and internecine feuds of Britons and Picts, Normans and Saxons, Border reavers and Scotch troopers, until at last *that* was accomplished by "the monstrous regiment of a woman," as John Knox says, which Hadrian could not do, and Severus failed to accomplish. Then a bright occidental star (quoting from Dr. Bruce) beamed upon those northern parts, and Law began to assert its supremacy.

In the reign of Commodus, A.D. 180, the Britons broke through the wall, killed the Roman general, ruined the army, and carried everything before them.

At length the presence of Severus in Britain began to turn the tide once more in favour of Rome. Herodian, in his account of Severus's proceedings, describes the Britons thus: "The natives swim through the fens, or run through them up to their waist in mud; for the greater part of their bodies being naked, they regard not the dirt. They wear iron round their necks and waist, esteeming this as much value as others do gold. They are a very bloody and warlike people, using a little shield or target and a spear."

As the Roman wall is sometimes spoken of as having been built by Severus, it may be as well to mention that both Herodian and Dion Cassius, as epitomized by Xiphilene, speak of the wall as already existing. The latter says, "The two most considerable bodies of the people in the island are the Caledonians and the Meatœ; the latter dwell near the barrier wall which separates the island into two parts, and the others live beyond them." We may conclude therefore that the wall was built, not by Severus, but by Hadrian.

The constant rebellions of the northern tribes at last so irritated Severus that he decreed a war of extermination against them; but in the midst of his enterprise he died, at York, February 4th, A.D. 211.

It is not within the scope of the present paper to trace beyond this period the history of the Roman occupation of Britain. I shall turn therefore to consider the extent and construction of the wall built, as we assume, by Hadrian. The wall is a barrier across the neck of this island, extending from Wallsend on the Tyne to

Bowness on the Solway Frith. Its total length is about sixty-eight miles three furlongs, it was, originally, about nineteen feet in height, and nine feet in thickness. It consists (*i.e.* the whole construction) of three parts : 1. A stone wall strengthened by a ditch on its north side. 2. An earth wall or vallum on the south side of the wall. 3. Stations, castles, watch-towers, and roads, for the accommodation of the soldiers who manned the barrier, and the transmission of military stores; these lie for the most part between the stone wall and the rampart. The whole of these works proceed in nearly a direct line from one side of the island to the other, in close companionship. The stone wall and the earthen rampart are generally within sixty or seventy yards of each other. The stone wall takes a straight course up the highest hills and down the deepest declivities, in this respect resembling the great wall of China; the earthen rampart however deflects from the straight line as occasion requires.

In the records we have handed down to us these two lines of fortifications are considered as the works of different periods—the earth wall or vallum has been ascribed to Hadrian; the stone wall or murus to Severus. This is the opinion of Horseley. But later conclusions are in favour of the whole being the result of one engineering scheme, and probably begun and completed by Hadrian. The wall never fails to seize the highest points of each opposing ridge of hills; it never bends at a curve, but always at an angle, in some cases being a succession of zigzags. Some portion of its course is through a region of basaltic formation, in which it has to make a way for itself through the hardest rock; it hesitates at nothing—the whinstones are disinterred, the basaltic rocks are excavated; it goes right on through all, a fit type of the iron will and the iron rule of those who constructed it. Bede is the earliest of our own writers who mentions it. He says it was in his time eight feet in breadth, twelve in height, in a straight line from east to west. Other writers who name it are Leland, Sir Kit Ridley (1572), Samson Erdeswick, Camden, Horseley, and Warburton.

The vallum or earth rampart also has a fosse on its south side, from which it has been supposed that this part of the construction was for defence against the rising of the southern people, who might be induced to attempt to regain their independence, whilst the barrier, with its northern fosse, was intended for protection from the Caledonians and Picts, who were thirsting for southern conquest.

Along the course of the whole fortification, at an interval of about a mile, were erected Castles, and at a further interval of four or five miles are Stations. These stations were military cities, and it is in these the altars and inscribed stones which occur in such abundance are mostly found. They are uniformly quadrangular, enclosing a space of from three to six acres, surrounded by a stone wall and a fosse. They were evidently intended as places of refuge while the wall was being constructed.

From the altars found in the stations we are able to gather by what cohort they were occupied; and in the *Notitia*, or *Army List*, we have the names of the stations occupied by certain cohorts given, so that we are able to restore these names with accuracy. The sixty-ninth section of this work contains a list of prefects and tribunes under command of the Duke of Britain; and the portion of the work in which we are interested is headed, "*Item per lineam valli.*" *

When therefore in the ruins of a station inscribed stones are found bearing the name of a cohort, we may assume by reference to the *Notitia* that the place where this cohort is stationed is the name of the place of the inscribed stone.

As may be supposed from the various nationalities occupying the stations we have different objects of worship attested by the altars found along the wall; hence we find not only the Roman deities, Apollo, Mars, Jupiter, Minerva, and so on, but Phœnician Astarte, the Syrian Virgo, and the Persian Mithras.

The lecturer then proceeded to speak of the worship of Mithras in the Roman empire, and the introduction of this cultus from its Persian birthplace into the less polished nations of the West; making special reference to the traces of Mithraic worship found in connection with the wall.

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* See page 47, the "Notitia Imperii," composed about the time of Theodosius the Younger, before the departure of the Romans from Britain.

AN UNNAMED FACTOR IN ORGANIC CONSTRUCTION.

ABSTRACT OF PAPER BY MR. F. H. BALKWILL, M.O.S.

(Read March 13th, 1879.)

THE evidence afforded by the independent concurrent testimony of the sciences of astronomy, geology, geography, and biology, the latter including palæontology, anatomy, physiology, embryology, and histology, each science or branch of science being the product of the accumulation of an immense number of facts by a great number of workers, all tending in the same direction, makes a theory of evolution necessary at the present time. In fact it seems impossible to think connectedly in any other manner. At the same time it is not proved that life ever spontaneously arose out of that which had no life; and there is no more *à priori* reason for including such a supposition in the theory of evolution than there is for supposing that a very subtle form of matter spontaneously arose out of nothing, as a preparatory step to the nebular hypothesis in astronomy. Neither is it necessary to a theory of evolution to believe that there was an unbroken hereditary line between the lowest form of life and the highest. This may be the fact, or it may not; as, for instance, the question whether man is descended from the ape has as yet received no affirmative answer in the finding of any intermediate types. As in geography it is well understood that all the land on the globe has a solid connection either above or under water, but still each island and continent requires special survey to inform us of its special shape and connections above water; so in the science of evolution as applied to animal life, we feel assured that there is some connection linking the whole, yet still we require that each species or genera shall be distinctly surveyed to note its connections; and where facts are not forthcoming must be content to hold our judgment.

The science of evolution requires much more attention to be paid to the conditions of life, which must have had immense influence in developing the varied species as pointed out by Darwin. The species seemed to be formed by these conditions as by a mould. Were these conditions known to the old philosophers as the "mothers"? Were they not the "environments" of Herbert Spencer? If species were to a great extent formed by their *habits*, would not the term *habitation* be suitable?

In developing to fill more difficult conditions, or take up their abode in higher habitations (using the word in the sense above indicated), more seemed necessary than mere "*survival of the fittest*" as adapted by "*irrelative spontaneous variation*." For instance, if we take the evolution of the canine tooth as representing a unit by which we might gauge the approximate time which it would take mere external conditions to evolve a particular type of tooth, the external conditions which it had to fulfil seem to be those requiring a weapon of offence or defence, conditions constant throughout nearly the whole range of animal life, both in time and space; yet this tooth was not finally *pronounced* until the appearance of mammals. Its development seems to have been from the lengthening of one or more teeth in the jaws of predatory animals as a death-dealing weapon, sometimes appearing in one position, sometimes in another, or several in the same jaw in different positions, as evidenced by several crocodiles, fishes (*dentex*), &c., as if feeling about for the best place for use, coincident with a shortening in the jaw to give more power, until reaching its highest type in the lion or tiger in the front of a short jaw, and yet wide apart.

A ruminant, on the other hand, has been developed by conditions much less extended both in time and space, and yet its teeth are of much greater complexity, are exceedingly well defined, and extend through a great many contiguous genera. Traces are to be found as if they arose among the pigs, and after becoming typical amongst the ruminants, died out among the horses and rhinoceri.

The type of the ruminant grinding tooth, which is that of a double crescent, involving a complicated involution of dentine, enamel, and cementum, is presented in most of the species in all the twenty-four back teeth, and not only so, but the twelve lower teeth, in order the more perfectly to reciprocate in action against the upper, stand in the inverse position in the jaws. Now if we take the time required by the evolution of the canine tooth as that required by "*irrelative spontaneity*," stereotyped by the *survival of the fittest*, we shall find that it would have taken an infinitely longer time to evolve one such tooth as a ruminant's; and *à fortiori* we shall require some other factor to be recognized, after one has been so evolved, before all the rest in the same jaw can conform to the same pattern. In fact the whole set of phenomena puts us more in mind of the progress of an invention, where, after one improvement has been made, its adoption is rapidly spread.

Growth is after all as much an action as any other. The lowest form of life, such as an amœba, performs voluntary or spontaneous action in taking food into itself, adding to its own body. Other low forms add a hard coat around themselves, and after performing this action a certain number of times it would become a *habit*, and if inherited an *instinct*. If a number of these low forms of life clustered together, and filled up the interspaces with the harder covering, or *formed material*, we should see a process very similar to that which histologists inform us we have in the cell formation of the tissues of the higher animals. Thus we see that the laws of growth may claim to come under recognition as showing *volition*, *habit*, *instinct*, *intelligence*. And we may note that common language gives to the word *habit* the double meaning of "familiar action" and *garment*, giving us some insight into the meaning of those beautiful lines of the poet Goethe, who was also a scientific man—

> "Here in the roaring loom of time I ply
> To weave the garment that thou seest me by."

THE DEVONSHIRE ASH-TREE CHARM.

COMPILED BY MR. W. PENGELLY, F.R.S., F.G.S.

(Read March 20th, 1879.)

I. Introductory.

The following paper has for its basis a *charm* or observance connected with certain Ash trees, and supposed to be curative in the case of particular ailments. Though it was probably once prevalent throughout Britain, it has, perhaps, become extinct, except in Devonshire, where it still displays so much vitality as to entitle it now to the name of *The Devonshire Ash-tree Charm.*

Having had an opportunity of getting very definite information respecting this charm when, so far as is known, it was last practised in this county, I was led thereby to a rather extensive course of reading, in order, if possible, to obtain replies to the crowd of questions growing out of the subject; and on this occasion I have little to offer beyond the somewhat numerous memoranda made from time to time, and which I have endeavoured to arrange in a more or less orderly sequence.

II. The Charm.

I. *As practised at Kingswear, on the River Dart:—*

Having been informed that at Kingswear, opposite Dartmouth, Devonshire, a child had recently been passed through an artificial slit in an ash-tree, in order to effect a cure of some ailment, I forwarded a series of questions to a lady dwelling there, who was so good as to obtain categorical replies directly from the mother of the patient, and on May 9th, 1877, to send them to me. On the 23rd of the same month, I had an interview with the parents, when I saw the child, and supplemented my information.

The parents are natives of Devonshire, respectable intelligent members of the artisan class; and the father is a journeyman carpenter. The child, a girl, was born on November 3rd, 1875, and being ruptured, it was speedily decided to "put her through an ash-tree;" and the good offices of an "old experienced man," then resident in the village, but now deceased, were secured for the purpose. He selected a tree in a small wood or "plantation," about half a mile distant, at the head of the inlet of the Dart, north of Kingswear, and on the left of the road to Brixham. To guard against any invalidity, care was taken to choose a "Maiden" tree, which men skilled in wood-craft say is "a self-sown tree, that has neither been transplanted nor lopped in any way;" in fact, a tree with which man has had nothing to do. With the assistance of a second man, there was made through the middle of the tree a longitudinal slit of sufficient length, and wedges were inserted at top and bottom to make and keep an opening wide enough.

It is not necessary that the patient should be of any definite age; but it is held that "the younger the better." No particular dress, or date, or day of the week, or hour of the day, or age of the moon, or state of the tide, is required; nor is it needful that the charm, as in the case of many others, should be wrought "on a fasting stomach."

All being ready, the child was taken to the tree on the afternoon of January 18th, 1876, when it was eleven weeks old, and, "in its usual dress," passed through the slit three times at that visit,—that being the orthodox number in the case. A second visit was held to be unnecessary.

In many charms it is supposed to be essential for the operator and the patient to be of different sexes; but this is immaterial in the ash-tree charm. In fact, the ceremony was performed by the "experienced old man," assisted by the child's mother and another woman. One passed the infant through the opening, taking care that it went "head foremost;" another received it on the other side, and passed it, towards the left hand, to the third person, who carried it to the first in the same direction; it being essential that it should "go round *with* the sun;" and so on through the three transits. When completed, a memorandum of the occurrence was carefully "put down" by one of the child's grandmothers, who furnished me with the exact date.

It is believed that if the tree thrives, and grows together after the wedges are taken out, the child will be cured and healthy; but that if the tree dies, or is sickly, such will also be the fate of the patient; and in order to make all secure, the severed portions of the tree are to be at once, not only brought into contact, but fastened together with nails. This was carefully attended to in the case under notice, and it is believed that the tree has fully recovered. The child is certainly sound, and looks strong and healthy; nevertheless, neither of its parents or grandparents has taken any interest in the ash, and none of them had ever seen it from the time the charm was wrought up to the date of my visit. They are satisfied with the child's recovery. Indeed, when I expressed a wish that the father would take me to the tree, he frankly stated that he had never seen it, and did not know its exact position. "I hadn't much faith in it at the time," said he, "and didn't go when it was done; but," he added, "'tis certain the child 's perfectly cured." Being instructed by his wife, however, respecting the exact locality, he accompanied me to the wood, where it was stated we should find several such trees, as many Kingswear children had been treated for rupture in the same way, in the same wood, and all had been cured. The girl, however, whose case has been just described, is not only the latest instance, but the only example of a female patient known in the district. The same "old man" had been the only principal operator within living memory; and he performed the charm quite gratuitously. He neither expected nor received any fee or reward; but it is not supposed that his doing so would have effected the efficacy of the charm.

On reaching the wood, a little search sufficed for the discovery of two trees which had certainly undergone the treatment. One of them was nine inches in circumference at the centre of the slit, where neither the bark nor wood had completely closed. Judging from the scar, the slit must have been about seven feet long. This was probably the tree we were seeking. In the other, which was eighteen inches in circumference, and had had a slit from six to seven feet long, the wood was quite closed, but, at and near the centre, the edges of the bark were about 2·5 inches asunder.

In reply to a question, my companion stated that he had never heard, nor did he suppose, that a patient perfectly cured would be in any way affected by anything which might subsequently befall the tree. It may be suspected, however, that he is more or less tainted with rationalism. (*Trans. Devon. Assoc.*, ix., 94–6.)

2. *As practised near Ashburton:—*

The Ash-tree charm is by no means confined to the Kingswear district. Mr. R. Dymond, F.S.A., writing in 1876, says, "Passing lately through a wood at Spitchwick, near Ashburton, a remark on some peculiarity in an ash sapling led to the explanation, from the gamekeeper, . . that the tree had been instrumental in the cure of a ruptured infant, and he afterwards pointed out four or five others that had served the same good purpose. With evidently perfect faith in the story, he stated that when a young infant is afflicted with rupture a small maiden ash is split for a length of five or six feet down the middle as it stands growing in the wood. The split halves being forced asunder, the naked infant . . . is passed three times in the same direction through the opening, and henceforth the defect is cured. The tree is then restored to its natural shape, and as it thrives so the child thrives. My informant instanced several well-known young men of the neighbourhood who had been subjected to the process in their babyhood, and had grown up strong and healthy. In one case, in which the tree had evidently suffered from the experiment, he referred to the deformity and sickly growth of the youth who had been passed through it." (*Trans. Devon. Assoc.*, viii., 54, 1876.)

3. *As practised at Shaugh, near Plymouth*:—

There is equally good evidence that the observance is not confined in Devonshire to the neighbourhood of the Dart. "It may not be uninteresting to many of your readers," says a writer in the *Athenæum*, for September 26th, 1846 (No. 997, p. 988), "to learn that in the year 1833, I witnessed at Shaugh, on the borders of Dartmoor, the actual ceremony of drawing a child through a cleft ash tree for the cure of rickets. The tree, which was a young one, was not split through its whole length,—a large knife was inserted about a foot from the ground, and the tree cut through for a length of about three feet. This incision being thus made, two men drew the parts forcibly asunder, until there was room enough to draw the child through,—which was done by the mother three times. This, however, as I remember, was not alone considered effective —it was necessary that the child should be washed for three successive mornings in the dew from the leaves of the charmed tree. . . . H."

4. *As practised at Boldventure, near Plymouth*:—

A writer to the same journal, for December 15th, 1849, says (No. 1155, pp. 1272–3), ". . . I had a little brother who was a delicate child, and after many attempts on the part of the doctors to restore him to health and strength, my mother was prevailed on by the nurse and certain old folks to have recourse to a plan for his recovery which it was confidently asserted had never failed in curing similar weakness. At a place called Boldventure, near Plymouth . . . a young tree was to be split from the top down to about the height of a person, and laid sufficiently open to pass the child through. I was very young at the time, but I have a vivid remembrance of being permitted to accompany the party . . . at three o'clock in the morning and before the sun rose, to witness the interesting ceremony. About one point I am not quite certain, but I believe the poor little fellow had his clothes removed. He was then passed through the tree by an old woman and received on the other side by some person. This was done three times, and on three consecutive mornings: the tree was then carefully bound together, and I can well remember for many years viewing it with great interest. My brother has grown to manhood, but whether that fact is due to his having paid these early morning visits to Boldventure I leave to the learned to decide."

5. *As practised in Cornwall*:—

That the treatment was occasionally practised west of the Tamar we learn from Mr. Robert Hunt, F.R.S., who, in his *Drolls, Traditions, and Superstitions of Old Cornwall* (First and Second Series in one Volume. *London.* J. C. Hotten), after describing a cure for rickets, or a crick in the back, says, "Strumous children were not unfrequently treated after another fashion.

"A young ash-tree was cleft vertically, and the parts being drawn forcibly asunder, the child was passed 'three times three times' against the sun through the tree. This ceremony having been performed, the tree was carefully bound together; if the bark grew together and the tree survived, the child would grow healthy and strong; if the tree died, the death of the child, it was believed, would surely follow." p. 415.

In a subsequent part of the same volume, Mr. Hunt says, "Weakly children—'children that wouldn't goode,' or thrive—were sometimes drawn through the cleft ash tree. I have seen the ceremony performed but in one case.

"The tree was young, and it was taken by the two forks,—bifurcation having taken place,—and by force rended longitudinally.

The cleft was kept open, and the child, quite naked, was passed head first through the tree nine times. The tree was then closed and carefully tied together. If the severed parts reunited, the child and the tree recovered together; if the cleft gaped in any part, the operation was certain to prove ineffectual." p. 421.

6. *In Gloucestershire:—*

This charm was far from being the exclusive property of the two south-western counties, but belonged apparently to the whole of England, if not to the British Isles. Mr. John Bruce, writing from "Hyde, near Stroud, Gloucestershire," in the *Athenæum* for September 5th, 1846 (No. 984, p. 908), says, "One important branch of the extensive subject . . . of Folk Lore comprises *Medical Superstitions;* and a curious subdivision of this branch of the subject relates to *trees used superstitiously with a view to the cure of diseases.* An instance of this kind of superstition has lately occurred in a parish in this neighbourhood, which it may be worth while to record. It is an evidence of the almost ineradicable power of superstition; and, also, of the extraordinarily defective condition of our popular education upon medical subjects.

"A poor woman, a native of the parish alluded to, applied a few weeks ago to the rector of that parish for permission to pass a sick child through one of his ash-trees. The object was, to cure the child of the disease ordinarily called the rickets."

7. *As practised in Warwickshire:—*

The following letter appeared in the *Gentleman's Magazine* for June 15th, 1804, vol. 74, p. 512:

"Mr. Urban:—On Shotley Heath in Silhill parish, Warwickshire, on the left hand side of the road going from Shirley-street to Hockley-house (on the high road from Birmingham to Hockley-house) and about a quarter of a mile from Shirley-street, there stands a young ash tree, close to the cottage of Henry Rowe, whose infant son Thomas Rowe was drawn through the trunk or body of it, in the year 1791, to cure him of a rupture, the tree being then split open for the purpose of passing the child through it. The boy is now thirteen years and six months old. I have this day, June 10, 1804, seen the ash tree and Thomas Rowe, as well as his father Henry Rowe, from whom I have received the above account; and he superstitiously believes that his son Thomas was cured of the rupture by being drawn through the cleft of the said ash tree and nothing else. R. G."

The foregoing letter drew forth the following, which appeared in the same Magazine in the succeeding September, vol. 74, p. 909.

"Mr. Urban:—The Ash-tree described by your Correspondent, p. 512, grows by the side of Shirley-street (the road leading to Birmingham from Hockley-house), at the edge of Shirley-heath, in Solihull parish. The upper part of the gap formed by the chizzel has closed; but the lower part remains open . . . and the tree is healthy and flourishing. Thomas Chillingworth, son of the owner of an adjoining farm, now about eighty-four, was, when an infant of a year old, passed through a similar tree, now perfectly sound, which he preserves with so much care that he will not suffer a single branch to be touched, for it is believed the life of the patient depends on the life of the tree, and the moment this is cut down, be the patient ever so far distant, the rupture returns, and a mortification ensues, and terminates in death, as was the case in a man driving a waggon on the very road in question. Rowe's son was passed through the tree in 1792, at the age of one or two. It is not, however, uncommon for persons to survive for a time the felling of the tree. In one case the rupture returned suddenly, and mortification followed. These trees are left to close of themselves, or are closed with nails. The Wood-cutters frequently meet with the latter. One felled on Bunnand's farm was found full of nails. This belief is so prevalent in this part of the country, that instances of the trees that have been employed in the cure are common. The like notions obtain credit in some part of Essex. . . . Another R. G."

8. *As practised in Hampshire:—*

White, in his *Natural History of Selborne* (ed. 1813), of which the first edition was published in 1788, says, "In a farm yard, near the middle of this village [Selborne, Hants], stands, at this day, a row of pollard-ashes, which, by the seams and long cicatrices down their sides, manifestly show that in former times, they have been cleft asunder. These trees, when young and flexible, were severed and held open by wedges, while ruptured children, stripped naked, were pushed through the apertures, under a persuasion that, by such a process, the poor babes would be cured of their infirmity. As soon as the operation was over, the tree, in the suffering part, was plastered with loam, and carefully swathed up. If the parts coalesced and soldered together, as usually fell out, when the feat was performed with any adroitness at all, the party was cured; but, when the cleft continued to gape, the operation, it was supposed, would prove ineffectual. Having occasion to enlarge my garden not long since, I cut down two or three such trees, one of which did not grow together.

"We have several persons now living in the village, who, in their childhood, were supposed to be healed by this superstitious ceremony, derived down perhaps from our *Saxon* ancestors, who practised it before their conversion to Christianity." pp. 239–240.

9. *As practised in West Sussex:—*

Mrs. Latham, in her Monograph entitled *Some West Sussex Superstitions lingering in* 1868, *Collected by Charlotte Latham, at Fittleworth*, published in the *Folk-Lore Record*, vol. i. pp. 1–67, by the *Folk-lore Society*, 1878, says, speaking of "the following remedy, still in common use in many parts of Sussex, for the cure of rupture in children," "A child so afflicted must be passed nine times every morning on nine successive days at sunrise through a cleft in a sapling ash tree, which has been so far given up by the owner of it to the parents of the child, as that there is an understanding it shall not be cut down during the life of the infant who is to be passed through it. The sapling must be sound at heart, and the cleft must be made with an axe. The child on being carried to the tree must be attended by nine persons, each of whom must pass it through the cleft from west to east. On the ninth morning the solemn ceremony is concluded by binding the tree lightly with a cord, and it is supposed that as the cleft closes the health of the child will improve. In the neighbourhood of Petworth some cleft ash trees may be seen, through which children have very recently been passed. I may add, that only a few weeks since, a person who had lately purchased an ash tree standing in this parish, intending to cut it down, was told by the father of a child, who had some time before been passed through it, that the infirmity would be sure to return upon his son if it were felled. Whereupon the good man said, he knew that such would be the case; and therefore he would not fell it for the world." pp. 40–41.

10. *As practised at Hawstead in Suffolk:—*

A Provincial Glossary; with a Collection of Local Proverbs, and

Popular Superstitions, By Francis Grose, Esq., F.R. and A.S.S., 1811, contains the following statement:—"If a tree of any kind is split —and weak, ricketty, or ruptured children drawn through it, and afterwards the tree is bound together so as to make it unite—as the tree heals, and grows together, so will the child acquire strength. Sir John Cullum, who saw this operation twice performed, thus describes it: 'For this purpose a young ash was each time selected, and split longitudinally about five feet: the fissure was kept open by my gardener; whilst the friend of the child, having first stripped him naked, passed him thrice through it, always head foremost. As soon as the operation was performed, the wounded tree was bound up with a packthread; and, as the bark healed, the child was to recover. The first of the young patients was to be cured of the rickets, the second of a rupture!'" p. 119.

The quotation from Sir John Cullum, was taken, no doubt, from his *History of Hawstead*, that work being named by Mr. Grose, in his Preface, as one of "the books chiefly consulted."

11. *General Statement*:—

Mr. John Evelyn, in his *Silva: or, A Discourse of Forest Trees*, with *Notes* by A. Hunter, M.D., F.R.S.L. and E., 4th ed., 1812, vol. i. p. 151, says, "I have heard it affirmed with great confidence, and upon experience, that the rupture to which many children are obnoxious, is healed by passing the infant through a wide cleft made in the bole or stem of a growing Ash-tree; it is then carried a second time round the Ash, and caused to repass the same aperture as before. The rupture of the child being bound up, it is supposed to heal as the cleft of the tree closes and coalesces."

On this passage the Editor, Dr. A. Hunter, offers the following *Note*: "The curing a ruptured child, by passing its body through a cleft made in the bole of a young Ash-tree, has no foundation in reason or philosophy."

The Doctor is no doubt correct. Nevertheless, the subject should scarcely be thus summarily dismissed. It may be worth enquiring whether the *belief* in the curing is better, or more deeply, founded than the *curing* itself; and, as a preliminary step, we may notice other facts connected with Ash Trees.

III. SUNDRY OTHER BELIEFS AND PRACTICES CONNECTED WITH ASH TREES.

1. *A Shrew-Ash* :—"At the south corner of the Plestor, or area, near the church [of Selborne], there stood," says Mr. G. White in his *Natural History and Antiquities of Selborne* (ed. 1813), "about twenty years ago, a very old, grotesque, hollow, pollard-ash, which for ages had been looked on with no small veneration as a *shrew-ash.* Now a shrew-ash is an ash whose twigs or branches, when gently applied to the limbs of cattle, will immediately relieve the pains which a beast suffers from the running of a *shrew-mouse* over the part affected; for it is supposed that a shrew-mouse is of so baneful and deleterious a nature, that wherever it creeps over a beast, be it horse, cow, or sheep, the suffering animal is afflicted with cruel anguish, and threatened with the loss of the use of the limb. Against this accident, to which they were continually liable, our provident fore-fathers always kept a shrew-ash at hand, which, when once medicated, would maintain its virtue for ever. A shrew-ash was made thus:—Into the body of the tree a deep hole was bored with an auger, and a poor devoted shrew-mouse was thrust in alive, and plugged in, no doubt, with several quaint incantations long since forgotten. As the ceremonies necessary for such a consecration are no longer understood, all succession is at an end, and no such tree is known to subsist in the manor, or hundred.

"As to that on the *Plestor*,

'The late vicar stubb'd and burnt it,'

when he was way-warden, regardless of the remonstrances of the by-standers, who interceded in vain for its preservation, urging its power and efficacy, and alleging that it had been

'Religione patrum multos servata per annos.'" pp. 240–1.

In *The Natural History of Stafford-shire* (by Robert Plot, LL.D., 1686) the author, having spoken of the occurrence of insects in the trunks of trees, says (ch. vi. pp. 222–3), "Yet more strangely than these have other *Animals* been found in the *body* of a *tree* somewhere near *Biddulph*, where two *workmen* sawing the *body* of a *solid Oak*, one of them at length perceived *blood* to follow the *saw*, which though it startled them not a little, yet resolving to goe on and see the issue, when they had cut to the end of the *batt*, they split asunder, and found the Saw had past through the body of a *Hardishrew* or *Nursrow* (as they here call them), *i.e.* a *field-mouse*, two others that lay by it escaping alive as soon as the *tree* was split, which being examin'd and found in all parts sound, the case remains an inexplicable *riddle* to all thereabout to this very day. But me-thinks to any one that considers the superstitious *Custom* they have in this *Country* of making *Nursrow-trees* for the cure of unaccountable *swellings* in their *Cattle*, the thing should not seem strange. For to make any tree, whether *Oak*, *Ash*, or *Elm* (it being indifferent which) a *Nursrow-tree*, they catch one or more of these *mice* (which they fancy bite their *Cattle*, and make them swell,) and having bored a hole to the *center* in the *body* of the *tree*, they put the *mice* in, and then drive a *pegg* in after them of the same *wood*, where they starving at last, communicat forsooth such a *virtue* to the *tree*, that *Cattle* thus swoln being whipt with the boughs of it, presently recover: of which *trees* they have not so many neither (though so easily made,) but that at some *places* they goe 8 or 10 miles to procure this remedy.

"Now though it may be improbable enough that the *swellings* of their *Cattle* arises [*sic*] from the *bites* of these *mice* . . . yet what hinders (since 'tis apprehended that these *mice* do it), but one may well imagin, that some person not farr distant might according to the superstitious *custom* of the *Country* make this *Oak* (unknown either to the *owner* or *workmen*) a *Nursrow-tree* but a little before it came to be cut down and sawn asunder, by *pegging* in these *mice*. Just as the *Irish* serve the *Connough worm* (a sort of *Caterpiller*) which they think *poysons* their *Cattle*, though it have no poyson in't, which they shut up in a hole thus bored in a tree, where when the *worm* is dead, the *bark & leaves* of that *tree* bruised and steeped in water, and given to the *Cattle* they apprehend thus poysoned, ever after gives them an infallible *cure*."

2. *Ash Trees and Serpents:*—Pliny, in his *Natural History* (Philemon Holland's Translation, ed. 1601), the Sixteenth Booke, chap. xiii. p. 466, says of the Ash, "The leaues of this tree, according to the Greeks, are hurtfull, venomous and deadly to Horses, Mules, and such labouring garrons; but otherwise to beasts that chew the cud, they be harmlesse. Howbeit, in Italy if horses, &c., do brouse of the leaves, they take no harme thereby. Moreouer, they be excellent good, and nothing so soueraigne can be found against the poison of serpents, if the juice thereof be pressed forth and giuen to drinke; or to cure old vlcers, if they be applied and laid thereto in manner of a Cataplasme: nay, so forcible is their vertue, that a serpent dareth not come neare vnto the shadow

of that tree, either morning or evening, notwithstanding at those times it reacheth farthest; you may be sure then they will not approch the tree it selfe, by a great way. And this I am able to deliuer by the experience which I have seene, that if a man doe make a round circle with the leaues thereof, and enuiron therewith a serpent and fire together within, the serpent will chuse rather to go into the fire, than to flie from it to the leaues of the Ash. A wonderfull goodnesse of dame Nature, that the Ash bloometh and flourisheth alwaies before that serpents come abroad; and neuer sheddeth leaues, but continueth greene, vntill they be retired into their holes, and hidden within the ground."

"I am astonished," says Evelyn, "at the universal confidence of some, that a serpent will rather creep into the fire than over a twig of Ash; this is an old imposture of Pliny, who either took it upon trust, or we mistake the tree." *Op. cit.*, p. 152.

Mr. R. Hunt, in his work already quoted, says (p. 420), "It is said that no kind of snake is ever found near the 'ashen-tree,' and that a branch of the ash-tree will prevent a snake from coming near a person.

"A child who was in the habit of receiving its portion of bread and milk at the cottage door, was found to be in the habit of sharing its food with one of the poisonous adders. The reptile came regularly every morning, and the child, pleased with the beauty of his companion, encouraged the visits. The babe and adder were close friends.

"Eventually this became known to the mother, and finding it to be a matter of difficulty to keep the snake from the child whenever it was left alone—and she was frequently, being a labourer in the fields, compelled to leave the child to shift for itself—she adopted the precaution of binding an 'ashen-twig' about its body.

"The adder no longer came near the child; but from that day forward the child pined, and eventually died, as all around said, through grief at having lost the companion by whom it had been fascinated."

Mrs. Bray, in her *Traditions, Legends, Superstitions, and Sketches of Devonshire*, &c., 1838, vol. i. p. 95, writes, when describing a visit to Wistman's Wood, Dartmoor, "The farmer says, ''Tis a wisht old place sure enough, and full of adders as can be.' . . . . The farmer offers me a speedy remedy . . . for he transfers to my hand the ashen bough or sprig that he was carrying in his own, and initiates me, on the spot, into the pagan rites of charming adders. . . . He tells me, that the moment I see an adder I have nothing to do but to draw a circle with an ash rod round it, and that the creature will never go out of it; nay, if a fire were kindled in a ring, it would rather go into the fire itself than pass the circle. He believed, also, that an animal bitten by this venomous reptile may be cured by having a kind of collar woven of ash twigs suspended round his neck."

3. *Ash Trees and Warts*:—Mr. J. O. Halliwell, in his *Nursery Rhymes and Nursery Tales of England* (London, F. Warne and Co., Fifth Edition, p. 288), says, "Whoever will charm away a wart must take a pin and go to an ash tree. He then *crosses* the wart with a pin three times, and, after each crossing, repeats:

'Ash-tree, ashen-tree,
Pray buy this wart of me!'

After which he sticks the pin in the tree, and the wart soon disappears, and grows on the tree instead. This must be done secretly. . . .

"*Another.*—Take a bean-shell, and rub the wart with it; then bring the bean-shell under an ash-tree, and repeat:

'As this bean-shell rots away,
So my wart shall soon decay!'

This also must be done secretly."

A writer in the *Athenæum* for August 11th, 1849 (No. 1137, p. 813) says, "It has been, and I believe is still, very prevalently believed, that by the use of the proper charm warts (in Norfolk called *rets*) may be removed from the hands, and transferred to an ash tree. The charm as practised by me when a boy of eight or nine years old, under the directions of a charwoman who worked in the house, was as follows:

"To go secretly to an ash-tree, taking a bill-hook or other sharp instrument, and to repeat the following verse or rhyme thrice, cutting or chopping the tree at the same time in one spot—

'Ashen tree, ashen tree, if you and I can agree
You shall have my rets of me.'

Then cut out the part of the bark that has been chopped and bury it, and as the bark rots the warts will waste. I do not remember the effects of the incantation. . . . L. L."

"In the cure of warts," says Mrs. Latham, in the Monograph already quoted, "the ash-tree has its part; persons annoyed with these unsightly excrescences, after pricking them with a number of pins, stick the pins into an ash-tree, and believe that as they become embedded in the growing bark, the warts will gradually disappear." *Op. cit.* p. 41.

The following Note appeared in *Notes and Queries*, 1st s. vii., 81, January 22nd, 1853:—"I remember in Leicestershire seeing the following charm employed for removal of a number of warts on my brother, then a child about five years old. In the month of April or May he was taken to an ash tree by a lady, who carried also a paper of fresh pins; one of these was first struck through the bark, and then pressed through the wart until it produced pain: it was then taken out and stuck into the tree. Each wart was thus treated, a separate pin being used for each. The warts certainly disappeared in about six weeks. I saw the same tree a year or two ago, when it was very thickly studded over with old pins, each the index of a cured wart. Liverpool. T. J."

Mr. James Britten, in his *Plant-Lore Notes to Mrs. Latham's West Sussex Superstitions* (see *The Folk-Lore Record. Part I. of the Folk-Lore Society*, p. 158, 1878), says, "In *Science-Gossip* for 1865, p. 85, a correspondent, 'R. H.' (Mr. Robert Holland), gives the following as a Cheshire remedy for warts in connection with the ash-tree, 'which is by many implicitly believed in.' '*Steal* a piece of bacon; rub the warts with it; then cut a slit in the bark of an ash-tree, raise up a piece of the bark, put in the bacon, and close the bark down again. In a short time the warts will die away from the hand, but will make their appearance on the bark of the tree as rough excrescences. This remedy has been quite successful in the case of my man, who told me!'"

4. *Ash Trees and Ague*:—A writer in the *Athenæum* for 17th October, 1846, No. 990, p. 1868, says, ". . . . . An old woman, a native of Worcestershire . . . . furnished me with the

following infallible recipe for the cure of Ague :—'Of course you know what a *maiden ash-tree* is. Well, if you are troubled with the ague, you go to a grafter of trees, and tell him your complaint; (every grafter notices the first branch of a maiden ash). You must not give him any money, or there will be no cure. You go home, and in your absence the grafter cuts the first branch.' Upon this I asked her "How long it was before the patient felt any relief?' 'Relief!' said the old lady, 'why he is cured that instant the branch is cut from the tree. G. P."

5. *Ash Keys and Children:*—Mrs. Latham, in her Monograph on West Sussex, says, "When a poor child has in vain been whipped and scolded for the nightly repetition of a certain involuntary offence, in the last resort one of the two following remedies may be tried: Upon the day appointed for the funeral of a person not of the same sex as the child, while the first part of the burial office is being read within the church, the child is to be taken to the open grave and is there to do that which constituted the original offence." . . . The second remedy "consists in the child's first going alone to fix upon an ash-tree suitable for the purpose of the charm, and going afterwards upon another day, without divulging its intention, to gather a handful of the ash-keys, which it must lay with the left hand in the hollow of the right arm. Thus are they to be carried home and then they are to be burnt to ashes. The charm is completed by the child performing the same ceremony over the embers on the hearth, which in the former remedy it was to go through at the open grave." p. 49.

6. *Ash Herding-sticks:*—ABERDONIENSIS, writing to *Notes and Queries*, 1st s., iv., 380, says, "The herd boys in the district of Buchan, in Aberdeenshire, always prefer a herding stick of ash to any other wood, as in throwing it at their cattle it is *sure* not to strike on a vital part, and so kill or injure the animal, which they say a stick of any other wood might do. . . ."

7. *Ash-wood Fires:*—According to Halliwell—

"'Burn ash-wood green,
'Tis a fire for a queen:
Burn ash-wood sear,
'Twill make a man swear.'

Ash when green," he adds, "makes good fire-wood, and, contrary perhaps to all other sorts of wood, is bad for that purpose when *sear*, or dry, withered." *Op. cit.* p. 265.

"The Ash," says Mr. Selby, "burns as freely in the green state or when newly cut, as it does when dry, giving out much heat with a clear flame, and very little smoke." *Op. cit.* p. 96.

8. *Ashen-faggot.* "W. G.," a correspondent of *Notes and Queries*, 4th s., i. 226, remarks that "A curious custon is prevalent in Devonshire of burning an ashen-faggot on Christmas Eve. The faggot is made of rather small sticks of the tree, bound together by a cord or withy, and so burned. The people tell you in explanation of the custom, that our Lord, when born, was dressed by a fire of ash sticks. . ." (See also *Trans. Devon. Assoc.*, vi. 268–9.)

9. *Ash-trees and Lightning*:—"The same superstition," Mrs. Latham tells us, "which looks upon the ash as possessing such supernatural powers of healing, regards it as an especial attraction of lightning to be avoided in a thunder-storm; and mothers teach their children to say—

'Beware of an oak,
It draws the stroke;
Avoid an ash,
It courts the flash;
Creep under the thorn,
It can save you from harm.'" *Op. cit.*, p. 43.

10. *An Even-ash*:—Several writers have recorded rhymes and charms in connection with what is known as an *Even-ash.*

"M. A. W.," writing in the *Athenæum* of November 7th, 1846, No. 993, p. 1142, says, "In the North Riding of Yorkshire, the even ash is employed as a charm in the following manner:—A young woman desirous of ascertaining who her husband will be, pulls an even ash privately from the tree, repeating at the moment these lines—

'Even-ash, even-ash, I pluck thee,
This night my own true love to see;
Neither in his rick nor in his rare,
But in the clothes he does every day wear.'

The twig is placed under her pillow at night, and the future husband, of course, makes his appearance in her dreams."

Mr. Halliwell says, in the work already quoted, pp. 299–300, "A girl must pluck a leaf from the even-ash, and holding it in her hand, say—

'This even-ash I hold in my hand,
The first I meet is my true man.'

She carries it in her hand a short distance, and if she meets a young man, he will be her future husband. If not, she must put the leaf in her glove, and say—

'This even-ash I hold in my glove,
The first I meet is my true love.'

She carries it in her glove a short time, with the same intention as before; but if she meets no one, she places the leaf in her bosom, saying—

'This even-ash I hold in my bosom,
The first I meet is my husband.'

And the first young man she meets after this will infallibly be her future partner."

He adds, "There are a great variety of rhymes relating to the even-ash. Another is—

'If you find even-ash or four-leaved clover,
You'll see your love afore the day's over.'"

"L. M. M.," writing to the *Athenæum* of November 7th, 1846, No. 993, p. 1142, mentions the last of the foregoing couplets, but with a slight difference. The following is his version, which he says is current in Wiltshire:—

"An even-ash or a four-leaved clover,
You'll see your true love before the day's over."

He adds, "It was told to me in my childhood by my nurse, who never, I think, forgot it when we passed by an ash-tree, or through a clover-field."

The Rev. T. F. Thiselton Dyer, M.A., in his *English Folk-Lore*, London: 1878, p. 14, speaks of the same lines, slightly modified, as being very prevalent in Devonshire.

Some of the even-ash rhymes, however, are scarcely so sentimental as the foregoing. Thus "P. P.," a correspondent of the *Athenæum*, says in that journal for October 17th, 1846, No. 990, p. 1068, "A friend in Wiltshire reminds me of some lines regarding the ash. It was once the practice, and in some obscure places may be so now, to pluck the leaf in every case where the leaflets were of equal number, and to say—

'Even-ash, I thee do pluck,
Hoping thus to meet good luck;
If no luck I get from thee,
I shall wish I'd left thee on the tree.'"

These lines are recorded by Mr. Hunt in his *Drolls, &c., of Old Cornwall*, already quoted, but with a slight variation in the last line. (See p. 421.)

The Rev. T. F. Thiselton Dyer says that it is supposed in some places that—

"With a four-leav'd clover, double-topp'd ash, and green-topp'd seave,*
You may go before the queen's daughter without asking leave."
English Folk-Lore, p. 13.

11. *Bowls made of the Ashen-Tree*:—Mr. Jabes Allies, writing to the *Athenæum* for January 2nd, 1847, No. 1001, p. 18, says . . "A gentleman who lately resided at Droitwich, near Bromsgrove [Worcestershire], has informed me that, till within the last twenty years, the children of that district used on St. Catherine's Day to go from house to house 'Catoning and Clemening,' as they called it, and sing the following lines:—

'If you're within,
Open the door and let us in;
And when we're in
We won't come out,
Without a red apple
Rolled up in a clout.

'Roll, roll,
Gentle butler, fill the bowl;
If you fill it of the best,
God will send your soul to rest;
But if you fill it of the small,
The devil take butler, bowl, and all.

'Our bowl is made of the *ashen*-tree,
Pray, good butler, drink to we;
Some for Peter, and some for Paul,
A few red apples will serve us all.'"

12. *Ash-Trees and Witches*:—"At Oldenberg," says the Rev.

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* "Seaves," he says, "are the rushes of which rush-lights or rush-candles are made."

T. F. Thiselton Dyer (*op. cit.*, p. 28), "it is believed that the ash appears without its red buds on St. John's Day, because the witches eat them the night before on their way to the orgies of Walpurgisnacht."

There appears to be an error here. The Walpurgisnacht—the night between April 30th and May 1st (See *Notes and Queries*, 2nd s. viii., 270)—is not so near any one of the numerous St. John's Days as the author's statement implies. (See Sir H. Nicholas's *Chron. of Hist.*, pp. 145–6.)

13. *Ash-Trees and Gipsies:*—The same author states (p. 34) that the gipsies believe that the cross was made of *ash.*

IV. THE CONNECTION OF ASH-TREES WITH IDOLATRY, MYTHOLOGY, &c.

Hitherto our attention has been confined to modern times, and, in most instances, even to the present century. The ash, however, is closely connected with the Idolatries and Mythologies of antiquity, as the following quotations show:

1. *The Ash and Idolatry:*—The prophet Isaiah (ch. xliv. v. 14–19) says, "He [the carpenter] planteth an ash, and the rain doth nourish it. Then shall it be for a man to burn: for he will take thereof and will warm himself; yea, he kindleth it, and baketh bread; yea, he maketh a god, and worshippeth it; he maketh it a graven image and falleth down thereto. He burneth part thereof in the fire; with part thereof he eateth flesh; he roasteth roast and is satisfied: yea, he warmeth himself, and saith, Aha, I am warm, I have seen the fire: And the residue thereof he maketh a god, even his graven image: he falleth down unto it, and worshippeth it, and prayeth unto it, and saith, Deliver me, for thou art my god. They have not known nor understood: for he hath shut their eyes, that they cannot see; and their hearts, that they cannot understand. And none considereth in his heart, neither is there knowledge nor understanding to say, I have burned part of it in the fire; yea, also I have baked bread upon the coals thereof; I have roasted flesh, and eaten it: and shall I make the residue thereof an abomination? shall I fall down to the stock of a tree?"

2. *The Ash and Mythology:*—Professor Max Müller, in his *Chip* entitled *The Norsemen in Iceland* (1858), says, "There are

several mythological expressions common to the Edda and Homer. In the Edda, man is said to have been created out of an ash tree. In Hesiod, Zeus creates the third race of men out of ash trees; and that this tradition was not unknown to Homer, we learn from Penelope's address to Ulysses: 'Tell me thy family, from whence thou art; for thou art not sprung from the olden tree, or from the rock.'" (See *Chips from a German Workshop*, vol. ii. 2nd ed., p. 198, 1868.)

The Edda mentioned by Professor Max Müller is that known as the *Prose* or *Younger Edda*, generally ascribed to Snorri Sturlason, of a distinguished Icelandic family (born 1178, died 1241). In it, Gylfi, King of Sweden, renowned for his wisdom and skill in magic, is represented as reaching the city of Asgard (the abode of the Gods), where, under the name of Gangler, he obtained access to a lofty mansion, in which were three thrones raised one above another, with a man sitting on each of them. Upon his asking what were the names of these lords, his guide answered, "He who sitteth on the lowest throne is a king; his name is Har (the High or Lofty One); the second is Jafnhar (*i.e.* Equal to the High); but he who sitteth on the highest throne is called Thridi (the Third).

Being encouraged to do so, Gangler proposes a series of questions, each of which is answered by one or other of the enthroned trio. Having received satisfactory replies to questions respecting the Supreme Deity, the Primordial State of the Universe, the Formation of the First Man and Woman, and a variety of other profound topics, "Where," asked Gangler, "is the chief or holiest seat of the gods?"

"It is under the ash Yggdrasill," replied Har, "where the gods assemble every day in council."

"What is there remarkable in regard to that place?" said Gangler.

"That ash," answered Jafnhar, "is the greatest and best of all trees. Its branches spread over the whole world, and even reach above heaven. It has three roots very wide asunder. One of them extends to the Æsir (Gods), another to the Frost Giants in that very place where was formerly Ginungagap (the yawning, gaping abyss), and the third stands over Niflheim (the shadow region of death), and under this root, which is constantly gnawed by Nidhögg (the Tenebrous Hewer or Gnawer) is Hvergelmir (the roaring cauldron). But under the root that stretches out towards the Frost-giants there is Mimir's well, in which wisdom and wit lie hidden. . . . .

"The third root of the ash is in heaven, and under it is the holy Urdar-fount. 'Tis here that the gods sit in judgment. Every day they ride up hither on horseback over Bifröst (the Tremulous Bridge or the Aerial Bridge), which is called the Æsir Bridge. . . . As for Thor, he goes on foot, and is obliged every day to wade the rivers Körmt and Œrmt, and two others called Kerlaung.

"Through these shall Thor wade every day, as he fares to the doomstead under Yggdrasill's ash, else the Æsir Bridge would be in flames, and boiling hot would become the holy waters. . . . Near the fountain, which is under the ash, stands a very beauteous dwelling, out of which go three maidens. . . . These maidens fix the lifetime of all men, and are called Norns. . . . ."

"What more wonders hast thou to tell me," said Gangler, "concerning the ash?"

"What I have further to say respecting it," replied Har, "is, that there is an eagle perched upon its branches who knows many things: between his eyes sits the hawk called Verdurfölnir (Concealing the weather, or causing serenity). The squirrel named Ratatösk runs up and down the ash, and seeks to cause strife between the eagle and Nidhögg (the Tenebrous Hewer or Gnawer) Four harts run across the branches of the tree and bite the buds. . . . . But there are so many snakes with Nidhögg in Hvergelmir (The Roaring Cauldron) that no tongue can recount them. As it is said—

'Yggdrasill's ash
More hardship bears
Than men imagine;
The hart bites above,
At the sides it rots,
Below gnaws Nidhögg.'

"And again—

'More serpents lie
Under Yggdrasill's ash
Than simpletons think of
. . . . .'

"It is also said that the Norns who dwell by the Udar-fount draw every day water from the spring, and with it and the clay that lies around the fount sprinkle the ash, in order that its branches may not rot and wither away. This water is so holy that everything placed in the spring becomes as white as the film within an egg-shell. As it is said in the 'Völuspá' (a Mythic-cosmogonic poem, the song of the Prophetess)—

'An Ash know I standing,
Named Yggdrasill
A stately tree sprinkled
With water the purest;
Thence come the dewdrops
That fall in the dales;
Ever blooming, it stands
O'er the Urdar-fountain.'

"The dew that falls thence on the earth men call honey-dew, and it is the food of the bees. The fowls are fed in the Urdar-fount; they are called swans, and from them are descended all the birds of this species."

The foregoing description of the Ash of the Edda, alluded to by Professor Max Müller, I have compiled from *Northern Antiquities* . . . translated from the French of M. Mallet, by Bishop Percy. New Edition . . . *with a Translation of the Prose Edda from Original Old Norse Text.* . . . By I. A. Blackwell, Esq. . . . *London.* Henry G. Bohn. . . . 1859. See pp. 395–413.

V. THE PHYSICAL AND CHEMICAL QUALITIES OF THE ASH.

Seeing, then, that the Ash may be said to be famous in all lands and in all times, it is natural to ask what are its physical and chemical qualities? and did it through them, or either of them, force itself on man's attention?

1. *Character of the Common Ash,* (*Fraxinus excelsior*, Will.):—"The ash," says the author of the article FRAXINUS, in the *Penny Cyclopædia*, x., 454–5, "is one of the most useful of our British trees on account of the excellence of its hard tough wood, and the rapidity of its growth. In its appearance too it is singularly graceful for a European tree. . . . The principal objection to the ash is the injury it does to the plants which grow in its neighbourhood, by rapidly exhausting the soil of all its organizable materials. In consequence of this few plants will thrive, or even grow very near it; and hence the impropriety of the common practice of planting the ash in hedgerows; the extent of its roots may always be distinctly traced by the languor and paleness of the crops that stand near it."

According to the *Encyclopædia Britannica*, article PLANTING, "The ash . . . is in most parts of Britain next in value as a timber-tree to the oak. The wood is chiefly used in the manufacture of agricultural implements, such as ploughs, handles to spades, mattocks, handles to carpenter's implements, carts, waggons, threshing machines, &c. Young ash-trees, and ash poles and suckers, are also much in demand for crate-ware, hoops, whip-handles, walking sticks, and especially for hop poles. . . ." 8th ed., xvii., 758.

Mr. Prideaux John Selby (*op. cit.*, p. 94–6) says, "The wood of the ash, though not so durable as the matured or heart-wood of the oak, surpasses it, and all our other indigenous trees, in toughness and elasticity of fibre, on which account it is almost universally used in the fabrication of all articles where these qualities are particularly required. Thus it forms the principal material in the making of such instruments and machines as are liable to sudden strains and shocks, and therefore is extensively employed by the maker of agricultural implements, by the coach-maker, wheelwright, &c. It is also used almost exclusively for the handles of spades and shovels, as well as for axes, picks, &c., and its elasticity renders it one of the best materials for boat oars. In many parts of England milk-pails are made of thin boards of this wood, each rolled into a hollow cylinder, with a bottom affixed to it, and Loudon recommends it as particularly adapted for kitchen tables, on account of its not being liable to splinter when under the operation of scouring. . . .

"From the early age of five or six years the planter begins to derive profit from the Ash, for we find that at this age it is fit to make into walking sticks; . . . at twelve or fourteen it is of a size sufficient to form hop-poles, hoops for casks, crates, and light hurdles. . . . When older, or as soon as it has attained a diameter of four or six inches, it becomes valuable to the cartwright and coachmaker, and at this size it cuts up to advantage for the handles of pitchforks, axes, picks, and agricultural implements. It also makes excellent staves for the barrels in which pickled herrings are packed. . . . . It also produces excellent potash, to make which the tops and loppings are generally consumed when the tree is felled."

According to Evelyn (*op. cit.* p. 150) "The use of Ash is (next to that of Oak itself) one of the most universal: It serves the soldier—*et Fraxinus utilis hastis*—and heretofore the scholar, who made use of the inner bark to write on, before the invention of paper. The carpenter, wheelwright, and cartwright find it excellent for ploughs, axle-trees, wheel-rings, harrows, butts; it makes good oars, blocks for pullies, and sheffs, as seamen name them: For drying herrings no wood is like it, and the bark is good for the tanning of nets; and . . . . is excellent for tenons and mortises; also for the cooper, turner, and thatcher; nothing is like it for our garden palisade hedges, hop-yards, poles, and spars, handles and stocks for tools, spade-trees, &c. In sum, the husbandman cannot be without the Ash for his carts, and other tackling, from the pike, spear, and bow, to the plough; for of Ash were they formerly made, and therefore reckoned amongst those woods which, after long tension, have a natural spring, and recover their position; so as in peace and war it is a wood in highest request."

The excellency of Ash-wood for handles of spears and implements of war seems to have been recognized at an early period. Such expressions as "Ashen-spear," "Ashen-lance," "Ashen-javelins," "Brass-tipped-ash" are of frequent occurrence in the *Iliad;* and Homer states of Achilles that

> "Forth from its case he drew his father's spear,
> Which he alone of all the Achaian host
> Could wield—huge, ponderous, strong, the Pelian ash,
> Which erst from Pelion's top, for his dear sire
> Chiron had felled, to be the bane of heroes."
> *Iliad* xix., 402–6, Wright's translation.

The poet mentions this "Pelian ash" at least four times.

2. *The Ash and the Mistletoe*:—"P. P.," writing in the *Athenæum* of 17th October, 1846 (No. 990, p. 1068), says, "The *mistletoe* is often found on the ash;" and Mr. J. C. Loudon, in his *Enclyclopædia of Plants*, 1836, p. 830, includes the Ash amongst the trees on which it will grow.

3. *Ash-Trees and Insects*:—Mr. S. Redmond, writing in *Notes and Queries*, 4th s., i. 226, of "the Valley of the river Slaney, in the county of Wexford," says, "In the gardens and about the orchards of the same district ash-trees were planted and cultivated with much care, as it was stated that insects, destructive of fruit

and vegetables, would not come where these trees were, or where the leaves fell."

According to Mr. Selby (*op. cit.* p. 99) "The leaves [of the Ash] are also the food of the larva of several Lepidoptera, among which is that of the beautiful *Catocala fraxini*, and upon the continent, in France, Spain, &c., they are the food of the *Cantharis vesicatoria*, blister beetle, which frequently abounds to such an extent as to consume the entire foliage, and leave the Ash-trees naked during the greater part of the summer; their presence, however, is attended with still more disagreeable consequences, as they exhale a pungent and unwholesome smell, and when dead upon the trees, and dried to a powder, the particles float in the air, and are apt to be inhaled and to produce dangerous symptoms. In the 9th vol. p. 119 of the *Magazine of Natural History*, we are informed by Mr. Giles Mumby, that he saw an ash-tree near Dijon which overhung the road, so covered with *Canth. vesic.* that the ground beneath was actually blackened with their excrement. Passing beneath the tree he felt his face as if bitten by gnats, and a sickening smell was perceived when at a considerable distance from it.

"In a half putrid or decayed state, the wood of the Ash is a nidus for the two beetles *Dorcas parellipidus* and *Sinondendron cylindricum*; the first we have not yet found in Northumberland, but the latter is abundant in the decayed wood of the Ash upon the banks of the Coquit. The bark, also, in a decaying state, or after the tree has been cut down a few months, becomes the nidus of the *Hylesinus fraxini*, a small beetle belonging to the family *Bostricidæ*, all the members of which are lignivorous."

Evelyn (*op. cit.* p. 152) states that "The shade of the Ash is not to be endured, because the leaves produce a noxious insect."

4. *Ash used medicinally*:—Mr. S. Redmond, of Liverpool, writing to *Notes and Queries*, 4th s., i. 225–6, says, "I have seen ash-bark boiled in new milk, and given to children as a specific for worms. I have also tasted the decoction, and I have little doubt it would not only kill the worms, but the children also, if given more than once; although I was informed it was by the direction of a medical man it was given. It is over thirty-five years since I tasted it, and yet the remembrance of that taste is as fresh in my memory as if it was yesterday. This sort of medicine (?) was very

common amongst the inhabitants of the valley of the river Slaney, in the county of Wexford."

Mr. G. Creed writes as follows in the same journal, 1st s., iv. 273:—"Lightfoot, in his *Flora Scotica*, vol. ii., p. 642, says 'That in many parts of Scotland (the Highlands), at the birth of a child the nurse or midwife puts one end of a great stick of the ash tree into the fire, and whilst it is burning receives into a spoon the sap or juice which oozes out at the other end, and administers this as the first spoonful of liquor to the new-born babe.' Phillips' *Silva Flora.* Why?"

Aberdoniensis, responding to Mr. Creed's query (1st s. iv., 380), says, "The reason . . . is, first, because it acts as a powerful astringent; and secondly, because the ash, in common with the rowan, is supposed to possess the property of resisting the attacks of witches, fairies, and other imps of darkness. Without some precaution of this kind they would change the child, or possibly steal it away altogether. . . ."

Dr. W. Withering, F.R.S., in his *Systematic Arrangement of British Plants, &c.*, 5th ed., 4 vols., first note, vol. ii., p. 84, Birmingham, 1812, when speaking of the Ash, says, "An infusion of the leaves, from half an ounce to an ounce and a half, is a very good purge, and a decoction of two drams of the bark, or six drams of the leaves, has been used to cure agues. The seeds are acrid and bitter."

Pliny (*op. cit.*, pp. 184–5), Second Tome, The foure and twentieth Booke, Chap. viii., says, "As touching the Ash . . . it beareth a seed enclosed within certain cods, which, being taken in wine, is an ordinary remedy for the obstructions and infirmities of the liuer; as also for the pain in the sides. The same also do euacuat the aquosities or waterish humors spread between the skinne and the flesh in the dropsie Leucophlegmatia; the leaves do take down by little and little, and make lean a body ouer-grosse, and do ease it of the troublesome cariage that it hath of so much fat, if the same be stamped and giuen in wine. But herein good regard ought to be had of the strength of the party after this proportion: If it be a child, fiue leaues of the ash are sufficient to be infused in three cyaths of wine; but elder folk, and of a stronger complexion, may abide seuen well enough in fiue cyaths, and drink the infusion. But before I do leaue this tree, it would not be forgotten that the small chips and shauings, yea, and the saw-dust or filed powder of this wood, are thought to be hurtful vnto some, and they are forbidden to meddle withall."

Mr. Evelyn (*op. cit.*, p. 15), says, "There is extracted an oil from the Ash . . . which is excellent to recover the hearing, some drops of it being distilled warm into the ears; and for the caries or rot of the bones, tooth-ache, pains in the kidneys and spleen, the anointing therewith is most sovereign. Some have used the saw-dust of this wood instead of guaiacum with success. The chymists exceedingly commend the seed of Ash to be an admirable remedy for the stone; but whether by the power of magic or nature I determine not."

Dr. Hunter, Evelyn's editor, makes the following remark on this passage:—"I shall only remark that the boasted properties of the oil obtained from the Ash are not to be depended on, being only in common with oil obtained from any other tree."

In the *Flora Scotica*. By John Lightfoot, A.M., 1777, vol. ii., pp. 641–2, the author, speaking of the Ash-tree, says, "Horses and sheep are fond of the leaves. The bark and seeds are reckoned a diuretic.

. . . .

"In warm climates a kind of sweet gum, called manna, distils from this tree, two ounces of which is a gentle cathartic.

. . . . "

5. *A Royalty on the Ash*:—"It is said at the present day" (says "Sp.," writing to *Notes and Queries*, 4th s., i. 225), "amongst the peasantry of Ireland, that there is 'a royalty on the ash,' and that, by the *old* law at any rate, no subject had a right to cut one down, even on his own property. As in England, where 'bows' were much used, the *yew* was the subject of special legislation; so, possibly, where the 'spear' was the prevailing weapon, the *ash* may have been 'protected.' Thus we may at any rate (apart from the mystic bearing of these superstitions) attribute the fame of the ash to use in arms and in medicine—two of the radical sources of traditions and superstitions in the youth of all nations. . . ."

VI. "Passing Through" not Restricted to Ash Trees.

Returning now to the charm with which we started, there seems reason to believe that, whilst the Ash is commonly, it is not exclusively, the tree through which the patient is passed. It will be remembered, perhaps, that Mr. Grose, in the passage already quoted, says, "If a tree *of any kind* is split, and weak, ricketty children drawn through it, and afterwards the tree is bound together so as to make it unite, as the tree heals and grows together, so will the child acquire strength." (See p. 135 above.)

Again, a writer in the *Athenæum* of October 17th, 1846 (No. 990, p. 1068), speaking of the practice of passing children through ash-trees, says, "We are assured by a most intelligent correspondent that a similar custom prevails in India (*with other trees, however*) [the italics are not in the original], where the father passes the child and the mother receives it."

Nor is a *tree*, or an *artificial* aperture, absolutely indispensable when a cure is to be effected. "To cure blackheads, or pinsoles, as they are sometimes called," says Mr. Parfitt, "the person affected . . . . is to creep hands and knees under or through a bramble three times with the sun; that is, from east to west. The bramble however must be of peculiar growth; that is, it must form an arch, rooting at both ends, and if it reaches into two proprietors' lands so much the better. Thus, if a bramble grows on the hedge of one owner, and a branch of which the end takes root extends into the field of another, the best form for working the charm is provided. This was related to a friend of mine by an old man, who when young had practised it, he being at that time badly affected with these troublesome 'boils.' After passing three times under such a bramble the blackheads gradually left him, and he has been quite free from them ever since. This story is from the neighbourhood of Rockbear [near Exeter]." (*Trans. Devon. Assoc.*, ix. 96, 1877.)

Indeed, the vegetable kingdom may be entirely dispensed with, for Dr. Borlase, in his *Antiquities, Historical and Monumental, of the County of Cornwall*, 2nd Edition, *London*, MDCCLXIX., says, "Another Relick of . . . Druid fancies and incantations, is doubtless the custom of . . . drawing children through a round hole made in flat rocks, to cure the Rickets." (p. 143.)

"In the Tenement of Lanyon [in the parish of Madron] stand three Stones-erect on a triangular Plan. . . . The middle Stone is thin and flat, fixed in the ground, on its edge, and in the middle has a large hole one foot two inches diameter, whence it is called the Mên an Tol (in Cornish the holed Stone). . . . . I apprehend that it served for Libations, served to initiate, and dedicate children to the Offices of Rock-Worship, by drawing them through this hole, and also to purify the Victim before it was sacrificed; and considering the many lucrative juggles of the Druids . . . it is not wholly improbable that some miraculous Restorations of health, might be promised to the people for themselves and children, upon proper pecuniary gratifications, provided that, at a certain season of the Moon, and whilst a Priest officiated at one of the Stones adjoining, with prayers adapted to the occasion, they would draw their infirm children through this hole. . . . . When I was last at this Monument, in the year 1749, a very intelligent farmer of the neighbourhood assured me, that he had known many persons who had crept through this holed Stone for pains in their back and limbs; and that fanciful parents, at certain times of the year, do customarily draw their young Children through, in order to cure them of the Rickets." (pp. 177–8.)

In short, we appear to be approximating the idea that the essence of the charm is in the act of *passing through*, and that it is of comparatively little importance through *what* the passage is made. "This form of operation," says Mr. John Bruce, in a letter in the *Athenæum* of September 5th, 1846 (No. 984, pp. 908–9), "was of almost universal use. Children offered to Moloch, 'horrid king! . . . passed through fire to his grim idol.' The passing through a cleft or aperture in a rock is a medical superstition which has been found in many countries. It is mentioned in the Asiatic Researches as common in the East Indies. Borlase commemorates it as practised with perforations of Druidical stones in Cornwall. In Scotland, the same superstition assumed another shape. Sick persons were passed through a garland of green woodbine, or a 'heap of green yarn,' which was afterwards cut in nine pieces and burnt, or buried in the earth."

Nevertheless, the connection of the Ash with the charm is remarkably conspicuous in, at least, the English usage. There were, however, differences of ritual in different localities: In some the child wore its ordinary dress, in others it was stripped quite naked; three times through at one and the same visit appears to have been the common practice, but two sufficed in the instances mentioned by Evelyn, whilst the Cornish children required nine times, and those of Sussex were not curable with fewer than eighty-one transits; one visit was commonly enough, but at Boldventure three consecutive mornings were devoted to the work, and on each the child was passed through three times, and the Sussex ritual required nine successive mornings and nine times through the tree on each of them; nothing beyond the "passing through" seems to have been needed elsewhere, but at Shaugh the child had also to be washed, on three successive mornings, in the dew from the leaves of the charmed ash; the split in the tree was usually not made longer than was necessary to allow the child to pass, but at Boldventure it was split from the top to a convenient height above the ground, and in Cornwall, where a forked tree was selected, it was rent from the fork throughout its entire length; at Kingswear three persons, including the mother, did the work, at Boldventure the parents, instead of being present themselves, entrusted the child to two operators, at Shaugh the operation was performed by the mother alone, whilst in Sussex nine operators had to attend, and each had to pass the patient once; in most cases the hour seems to have been unimportant, at Boldventure, however, it was deemed so necessary to work the charm before sunrise that the party reached the ground at three in the morning—the season being, no doubt, summer—whilst in Sussex sunrise seems to have been the orthodox hour; "with the sun" was the stipulated direction, except in Cornwall—where it is distinctly stated to be "against the sun"—and in Sussex—where it is vaguely said to be "through the cleft from west to east," which is equally consistent with "with the sun," or "against the sun;" the operators appear to have been commonly left to their own devices about how to split the tree, but in Cornwall "the tree was taken by the two forks . . . and by force rended longitudinally," and in Sussex "the cleft must be made with an axe."

The differences of ritual, however, seem to have had little or no effect in retarding the cure; a fact which must be comforting to the nonconforming mind, and to sticklers for the right of private judgment.

If ordinary human testimony is to be accepted, there can be no doubt that, in most cases, the patients were sound after having undergone the treatment; that there was a general belief that they had experienced cures; and that the cases of apparent failure were due to defect in the health of the tree. I will not enquire to what extent the children were previously unsound.

A writer, over the signature "H," in the *Athenæum* of September 26th, 1846 (No. 987, p. 988), says, "It is not difficult to understand that the exposure of the infant to the genial influences of the morning air, and the washing which is also required, may, in some cases, give rise to an improved condition in the health of the child, which has been, no doubt, often attributed to the influences of the ash tree and the holed stone."

The author is alluding to the charm as practised at Shaugh in this county—where alone, so far as I can find, the washing on three successive mornings was observed. I confess to considerable scepticism respecting the beneficial influences of exposing a naked infant to the morning air.

VII. SPECULATION.

1. *Why the Ash?*:—To say that its prominent connection with mythology led to the very prevalent selection of the Ash in curative charms may be a step in the right direction; but, at most, it brings us only to the question, How was that connection attained? The suggestion by "L," in the *Athenæum* of October 3rd, 1846 (No. 988, p. 1018) that "of the reasons of the ash being used to pass children through, the most probable one seems to be, that the ash splits easiest and grows over soonest," may, whilst certainly prosaic, be not unphilosophical.

The various striking characters and natural connections of the tree, and especially the numerous useful purposes to which, as we have seen, it was applied even in very early times, may have led men in the infancy of civilization, to regard the Ash as a general and a sacred benefactor, as it cannot be doubted was the fact in many other cases, and which is not without a parallel in the history of a probably still living Devonshire tree, as the following story will show:—

During a ramble along the coast between the Start and Prawle Points, in South Devon, my attention was directed to a large and ancient Elder tree, adjacent to a ruined mill-house at Lannacombe Cove.

"There isn't," said my companion—a gentleman residing in the district—"a person, old or young, living in this neighbourhood, who would dare to injure that tree, or to take from it a twig, or a flower, or a berry, or even a leaf."

"Is it held to be sacred then?"

"Well, yes, in a certain sense. The facts are these:—During our last war with France, a French privateer, hovering on the coast, sent at nightfall a boat's crew ashore, who took from the miller who then lived here everything they could find, even the bed under his wife, who had recently been confined. Having by him a considerable sum of money in a purse or small bag, he, without being observed, flung it out at the window, hoping that it might thus escape the privateers, and that he might recover it in the morning. At day-break there was no trace of the privateer; and on proceeding to that part of his premises where, if anywhere, his money would be found, he had the good fortune to see his purse with all its contents hanging in the elder tree. From that time it has been free from every kind of molestation on the part of those who know the story; and parents still point it out to their children as 'the tree which saved the miller's money.'" (*Trans. Devon. Assoc.*, ix., 99–100.)

2. *Symbolization:*—On my way back, on May 23rd, 1877, from the visit to Kingswear mentioned at the beginning of this paper, I felt strongly impressed with the idea that the "passing through" was symbolical of *something;* and, after much cogitation on the facts of the case I had been studying, arrived at the conclusion that the "something" was *birth*, and birth free from human impurity of any kind. The defective child had been *born again*, and the result was greater perfection.

To this conclusion I have ever since adhered, and farther thought and reading have but strengthened my conviction. Indeed, I soon found that I had been anticipated. "All these various passings through," said Mr. Bruce, in the *Athenæum* article already quoted, "seem symbolical, as Dalyell has remarked [*Darker Superstitions of Scotland*, p. 123] of regeneration, 'a second birth, whereby a living being is ushered into the world free from those infirmities and imperfections incorporated with a former life.'"

3. *Is Regeneration a doctrine peculiar to Christianity?*—The

foregoing conclusion leads naturally and directly to the question :—Was the thing symbolized exclusively Christian, whilst the mode of symbolization alone had a pagan basis? To this question a tolerably direct and conclusive reply seems to be contained in the following statements and quotations :—

A writer in the *Athenæum* of October 17th, 1846 (No. 990, p. 1068), already quoted (see p. 154 above), says that the passing of ricketty children through a split tree "is held by the Brahmins to represent a new birth ;" and "Ambrose Merton," a name assumed, it is said, by Mr. Thoms, for many years editor of *Notes and Queries* (See *Popular Romances*, &c., by Robert Hunt, F.R.S., London, 1871, p. 421), quotes the Anglo-Saxon version of the *Canones Edgari*, in Thorpe's *Ancient Laws and Institutes of England*, forbidding tree-worshippings and stone-worshippings and that devil's craft whereby children are drawn through the earth ;' and he closes an interesting article on the subject, in the *Athenæum* of September 12th, 1846 (No. 985, p. 932), with a quotation from *Ælfric's Homily on the Passion of St. Bartholomew the Apostle* (vol. i. p. 475, of the *Homilies of the Anglo-Saxon Church*), edited for the *Ælfric Society*, by Mr. Thorpe :—"It is not allowed to any Christian man to fetch his health from any stone, nor from any tree, unless it be the holy sign of the Rood, nor from any place, unless it be the holy house of God."

With these passages before me I cannot resist the belief that the doctrine of Regeneration was held by, at least, some pagan nations independently of Christian teaching or influence.

P.S. Since the foregoing Paper was read, Mr. P. F. S. Amery, of Druid, near Ashburton, writing me on 3rd April, 1879, was so good as to enclose the following statement respecting another recent case of the *Ash-tree Charm* in Devonshire :—

"The following case came under my notice. The son of a small farmer residing at Ashburton was found shortly after his birth to be suffering from a rupture, which gave much pain. For some months various remedies were tried without success; and in 1872, when the child was about a year old, recourse was had to the Ash tree.

"A small sapling 'maiden Ash,' about 2·5 inches in diameter, growing in a thick wood, was selected. By the aid of a hatchet and hammer a cleft two feet long was made in it about four feet above the ground. The father of the child held the severed parts asunder, while the mother passed the child three times head foremost through the slit. The opening was then closed, and fastened together with three twisted withies. On examination twelve months afterwards, I found the parts had failed to unite, probably owing to the slit being too much on one side, which caused the thin portion to dry up, and after a time to break through.

"The operation was therefore a failure, and the boy still suffers from the rupture. The tree is preserved, and can be examined by the curious.

"The time of the day when the charm is worked is not here supposed to be of any consequence. P. F. S. A."

TRACES OF THE SCANDINAVIAN ON DARTMOOR.

BY MR. C. SPENCE BATE, F.R.S.

(Read March 27th, 1878.)

The lecturer drew attention to the varying character of the antiquities found upon Dartmoor (which he illustrated by a number of sketches), and pointed out that they might be divided, so far as their origin was concerned, into two distinct and well marked classes. They had in fact in those antiquities the remains of the occupation of two races. These he identified with the general inhabitants of the country, and with the Scandinavians, who had found their way to Dartmoor in search of tin, and had formed settlements there to enable them to prosecute their designs.

A peculiar feature in the early monuments of this country was to be found in the stone avenues of Dartmoor, some of which were of very great extent, and which were always associated with traces of interments. He believed that in these avenues—which were found nowhere else—they had the memorials of battles between the Scandinavian invaders and the inhabitants, erected on the spots where the conflicts took place, and intended to record not merely their occurrence but their character.

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On some British and Druidical Remains in Chagford and Gidley. (Illustrated.)	G. W. Ormerod, F.G.S.
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